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FEMATS Graphical Interface and User's Manual

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FEMATS GUI User's Manual

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Contents

Abstract

This manual outlines the features and usage of the new Graphical User Interface (henceforth GUI) for FEMATS. An example run using the NASA almond is worked to demonstrate the use of the new GUI. A brief installation procedure is included, as is a discussion of some of the more important directories and files in the installation.

Chapter 1

User's Manual for the FEMATS GUI

1.1 Introduction

The GUI has become a critical component in user-oriented codes which provide multifunction capabilities. FEMATS is such a code, bringing together a number of different technologies and capabilities. Moreover, because FEMATS is able to run on serial, vector and parallel platforms, a user interface to manage the submission and execution of jobs on these platforms is essential. Using FEMATS, a user will typically go through the following steps in an RCS/radiation simulation:

- Definition of a new target using a solid modeler or retrieval of a previous created target geometry.
- Specification of the materials in selected regions
- Generation of the surface and/or volume mesh and element/mesh quality inspection
- Selection of a mesh truncation scheme and solver (Pro-Solver, BCG, FMM, AIM, etc.)
- Data run specification (frequency ranges, angles, output format selection, etc.)
- Submission of the problem to one of the available computational platforms
- Monitoring the status of the solver
- Data extraction and display of RCS and surface fields using line plots and 3D visualization software

The GUI is a valuable tool for managing and coordinating this complex sequence of tasks, especially given the intent of developing a code that may be used by entry-level engineers. Even more to the point, however, is the eventual integration of RCS simulators into broader design codes. Integration of a code of this sort into a simulation environment which already combines aerospace and other disciplines clearly necessitates such a graphical interface with its extra organization and management abilities.

The FEMATS GUI is intended to greatly simplify the use of the collection of programs necessary to run FEMATS. It does this by providing a consistent, easy-to-understand interface that cohesively ties all the steps required for an RCS simulation with FEMATS into one simple process. This allows the user to ignore the mechanics of the solution procedure, and instead concentrate on the electromagnetics of the problem. A diagram further detailing the FEMATS GUI's function(s) is shown in Figure 1.1.

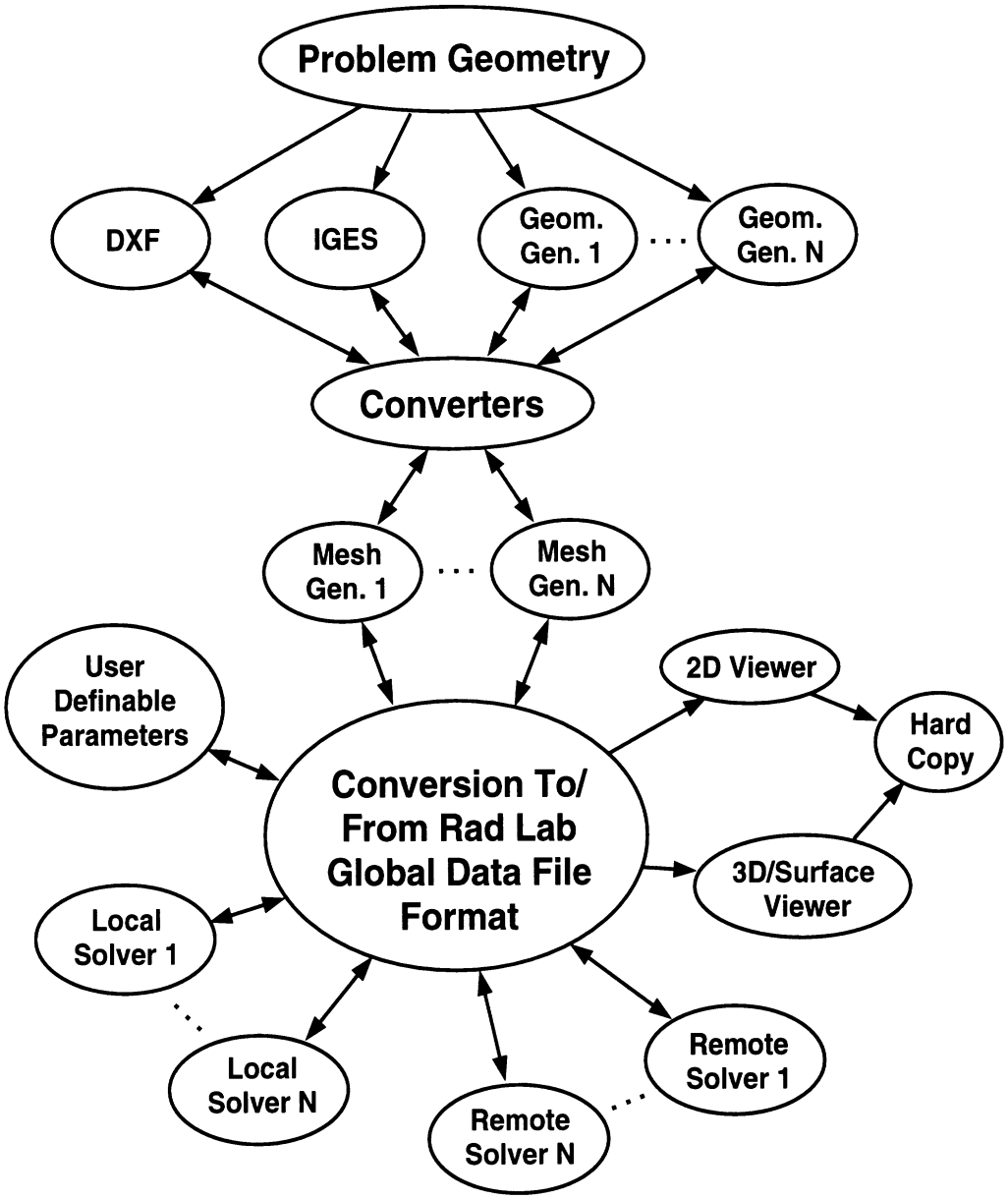

Figure 1.1: Functions administered by the FEMATS GUI using the project construct.

1.2 The Project Concept

The FEMATS GUI is based on the concept of a project—a name, a data structure, and an organizational idea that groups and organizes all the pertinent information about a certain task in one location. In doing this, redundant information is eliminated, and an extra level of order and structure is both provided and enforced. All the information about the project is stored permanently in a special file called a project file. This project file keeps track of what data is available, what data is missing, which parts of the analysis have or have not been run, etc. It also keeps track of all the miscellaneous information used by FEMATS that previously needed to be managed by the user.

The base name of the project file is the name of the project, and the extension is `.prj`. The project file itself is placed in the current working directory, and all the files related to that project are stored in a subdirectory with the same name as the project. Given this, a short but descriptive name for the project should be chosen when prompted. It is worth noting that the FEMATS GUI will not

allow any further action to be taken until a project is loaded.

1.3 Starting & Running the FEMATS GUI

1.3.1 Overview

To start FEMATS, after completing the installation as described below in Chapter 3, type

```
femats
```

at the prompt. In a second or two, a window like that shown in Figure 1.2 should appear in the upper right quadrant of your screen.

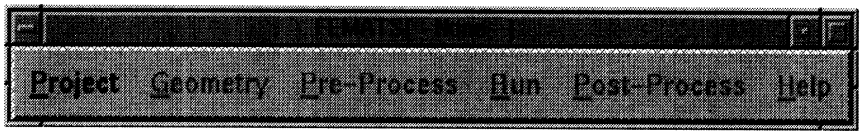

Figure 1.2: FEMATS Main Menu, with no project selected.

1.3.2 Notational Notions

There are a few standard ideas applied to the notation in the FEMATS GUI. Each is trivial in itself, but in concert serve to make the interface easier to learn and use, and help guide the user through the simulation process.

Shadowed text: Indicates that the selection or input field shown is not available for use. Depending on the situation, this may be due to a lack of information, as is the case in Figure 1.2, where a project has not yet been defined. Until a project is defined, the FEMATS GUI will not allow any other actions. The shadowing may also be a result of a prior choice, the results of which include the invalidation of the particular option or input in question.

Ellipsis (...): Indicates that some sort of information requestor will appear. An example of this is the **Open** item in the **Project** menu in Figure 1.3.

Underlined characters: Indicates the presence and availbility of hot keys/key-stroke combinations. (Not fully implemented yet.)

`Courier` **font:** Generally indicates direct interaction with the computer – text to be typed-in verbatim, or textual output from the computer.

Sans Serif Courier **font:** Used to indicate the system-dependent portion of a filename or path. That is, the portion of a path or filename that must be changed to make it applicable on the individual user's system. See Section 2.2 for more information.

1.4 Project Menu

1.4.1 Overview

As was discussed above, the organizational unit in the FEMATS GUI is the project. Nothing can be done in FEMATS until a new project is defined, or an old one is loaded. To start a new project, or

to select an old one, click on **Project**, and select the appropriate option from the pull-down menu, shown in Figure 1.3. A dialog window like that shown in Figure 1.4 will appear, prompting for the

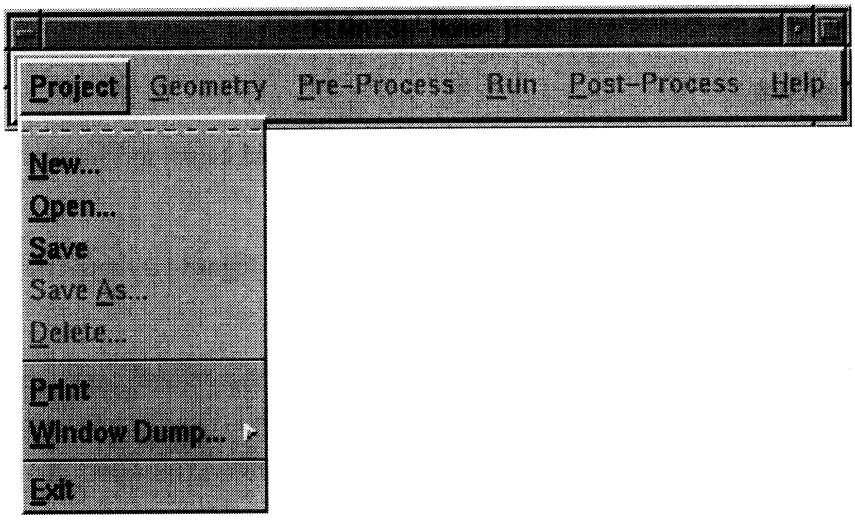

Figure 1.3: Project menu

name of the new project. If a previously defined project is opened, FEMATS will load it, and the rest of the options in the main menu will be enabled, making it look like Figure 1.5. If a new project is defined, FEMATS initializes the copy of the project file that is stored on disk, but then requires the user to open it as they would a previously defined project, even though no work has been completed on it. The main menu items will then be enabled, as discussed above.

An indication of what project is being worked on is given in the title bar of the window containing the main menu. In Figures 1.2 and 1.3, following the name **FEMATS**, { **–None–** } is displayed, indicating that there is no current project. However, after a project is chosen, the title bar is updated, as shown in Figure 1.5, where the new project is entitled **demo**.

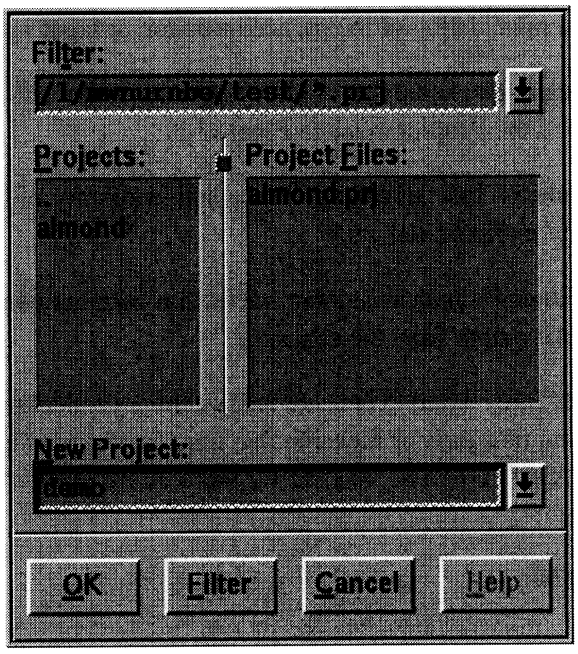

Figure 1.4: New Project dialog, prompting the user to enter the name of the new project.

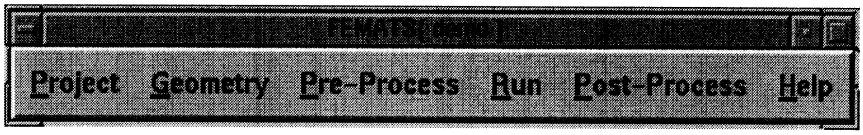

Figure 1.5: FEMATS Main Menu, with project selected.

1.4.2 Detailed Descriptions

New... Defines and initializes a new project. Utilizes a file requestor dialog similar to that in Figure 1.4.

Open... Opens a previously defined project for continued work. Utilizes a file requestor dialog similar to that in Figure 1.4.

Save Saves the current project under the current name.

Save As... Renames the current project, and saves it under the new name. Utilizes a file requestor dialog similar to that in Figure 1.4.

Delete... Deletes the specified project. Utilizes a file requestor dialog similar to that in Figure 1.4. (Not fully implemented yet.)

Print ASCII dump of pertinent information regarding the project. (Not fully implemented yet.)

Window Dump... Individual window graphics dump. (Not fully implemented yet.)

Exit... Exits the FEMATS GUI.

1.5 Geometry Menu

1.5.1 Overview

The **Geometry** menu in Figure 1.6 provides an interface to the various solid modelers and geometry editors available to the user, as well as to format conversion utilities. In the beginning stages of a project, when the geometry is being defined, the editor is chosen under **New...**, along with the other default settings. Once the initial setup is complete, further access to geometry-related items is available through the **Edit...** menu. If the geometry in question has already been developed, format conversion utilities are available under **Format Conversion...** to convert the original geometry format to the internal FEMATS formats.

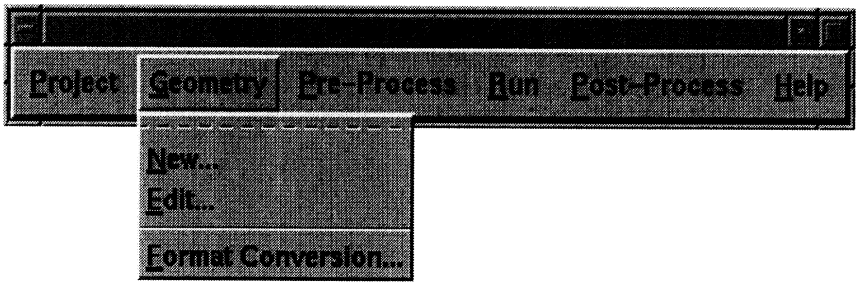

Figure 1.6: Geometry menu

1.5.2 Detailed Descriptions

New... Starts the process for defining a new geometry, including the choice of the editor.

Edit... Provides access to the current geometry in the editor of choice.

Format Conversion... Provides access to format conversion utilities.

1.6 Pre-Processing Menu

1.6.1 Overview

After the target geometry has been developed, it must first be meshed and then processed for input to the FEMATS solver(s). The **Pre-process** menu in Figure 1.7 provides a first-level interface to these mesh generation and preprocessing functions in FEMATS. Figure 1.8 shows the submenu that interfaces with the various meshing packages.

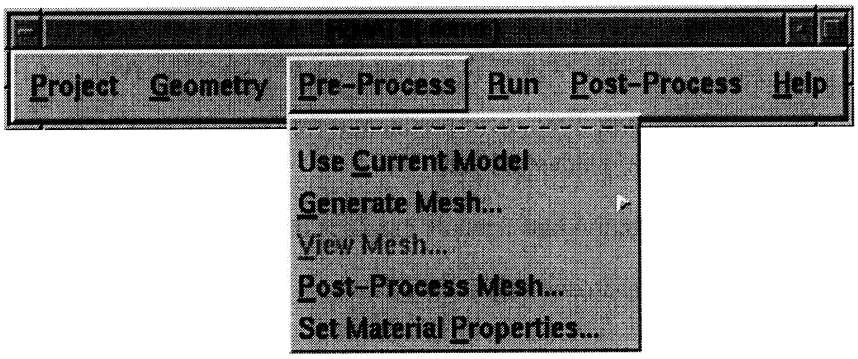

Figure 1.7: Pre-Processing menu

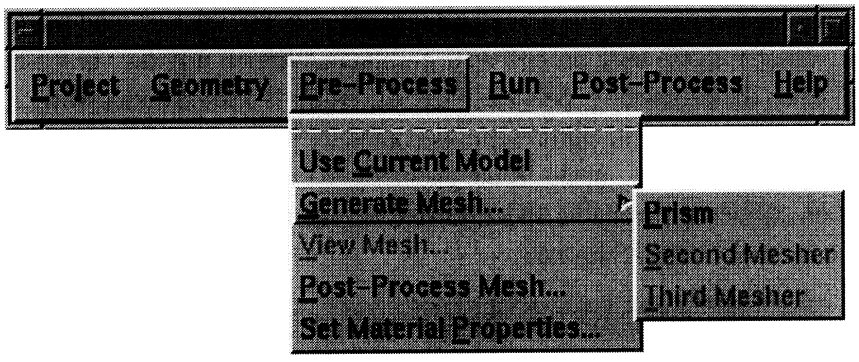

Figure 1.8: Meshing sub-menu

1.6.2 Detailed Descriptions

Use Current Model Not currently in use.

Generate Mesh... Pulls down a sub-menu that accesses the available meshing packages.

Prism 3-D meshing package. Uses the ACAD 2-D surface facet file as a starting point, and "grows" the 3-D mesh from that. The user-interface to the controls for Prism is shown in Figure 1.9. Further discussion and information on its usage may be found in Sections 1.6.3 and 2.3.

Second Mesher Other meshing package...

Third Mesher Other meshing package...

View Mesh... Allows inspection and modification of meshes formed by the mesh generators, above. Currently under development.

Post-Process Mesh... Processes the mesh for input to the FEMATS solvers. An example window is shown in Figure 1.10.

Set Material Properties... Provides a means to define the material properties for those meshes which were created using less-capable mesh generators. Figures 1.11, 1.12, and 1.13 show the three available input screens, one each for dielectrics, resistive sheets, and impedance sheets, respectively.

1.6.3 Prism

1.6.3.1 Introduction

Prism is one of many available public-domain grid generators. It was developed at NASA Ames by Shishir Pandya for solving fluid flow problems on a prismatic grid. From a 2-D surface mesh, which is obtained from some other package, it creates a 3-D grid by extending the individual surface normals outward layer by layer, gradually constructing the computational domain around the object of interest. Several techniques are available internally for construction and optimization of the grid, depending on its final use.

Prism was chosen for integration into FEMATS both because of its ease of use and because of the inherent geometrical and numerical advantages of prismatic elements. Prismatic elements combine the geometrical flexibility of tetrahedral elements with the simluation efficiency of brick elements. Also, because a prismatic grid is constructed layer by layer, it is quicker and easier to generate than the geometrically equivalent tetrahedral mesh.

For further information regarding the internals of Prism, the interested user should see the Prism subdirectory of the documentation directory of FEMATS (`/l/EM/femats/doc/prism`), and possibly contact Shishir Pandya at NASA Ames. Parts of Prism have been modified or added to in order to facilitate the interface to familiar geometry generators and the FEMATS preprocessors. The GUI pictured in Figure 1.9 was also developed to make Prism easier to use.

1.6.3.2 Detailed Descriptions

For the most part, the FEMATS GUI takes care of the settings for the grid generation using Prism. However, some parameters much be entered by the user, as they cannot otherwise be deduced. Overall, the following information is required by Prism:

Name of Surface Datafile The input file to Prism, consisting of all the data for the 2-D triangular surface mesh of the object of interest. Because of the input file's format, it is typically generated by a conversion program from the file output by

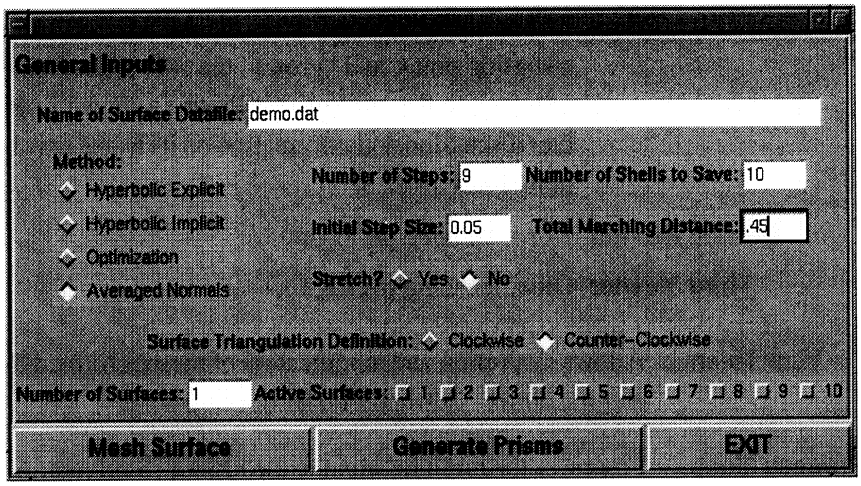

Figure 1.9: Prism grid generator user-interface.

the original surface mesh generator or solid modeler. For example, if ACAD is used as the original modeling package and 2-D grid generator, a program called `ac2pr` is automatically run by the FEMATS GUI to convert the ACAD facet file into a form readable by Prism. This input is automatically supplied by the FEMATS GUI, and should only need to be changed under unusual circumstances.

Method Determines how the generated grid will be optimized. Of the available choices, the **Averaged Normals** selection seems to generate the best grids, so it is recommended that this option be left alone. This input is automatically supplied by the FEMATS GUI.

Number of Steps The number of layers of prisms desired. Automatically supplied by the FEMATS GUI, but almost certainly needs to be modified by the user. NOTE: This number includes the layers of absorber.

Number of Shells to Save The number of surfaces between the layers of prismatic elements. Always **one more** than the **Number of Steps**. Automatically supplied by the FEMATS GUI.

Initial Step Size The initial layer thickness. This, combined with the **Stretch** parameter, below, allows variable thickness elements. However, for the most part, **Stretch** is turned off, making this input the layer thickness for each layer. Automatically supplied by the FEMATS GUI, but almost certainly needs to be modified by the user.

Total Marching Distance Total thickness of all the layers if **Stretch** is on. As mentioned above, **Stretch** is usually turned off, so this parameter is usually ignored. Automatically supplied by the FEMATS GUI.

Stretch Method to provide automatic layer thickness adjustment. Generally not used. Automatically supplied by the FEMATS GUI.

Surface Triangulation Definition Determines the node ordering to ensure that the surface normals point outward from the surface. Counter-Clockwise corresponds

to the Right-Hand Normal (RHN) convention defined in ACAD. For example, if you curl your fingers around a facet coincident with the node numbering increment, you thumb will point in the direction of the normal, which is away (outwards) from the object. The RHN convention is also used by FEMATS.

The **Number of Surfaces** and **Active Surfaces** inputs are not utilized in FEMATS.

Following the input of the above data, click on **Generate Prisms**. A temporary window will open, and display the progress and status of the grid generator. It will then prompt the user for the desired output element type – prisms or tetrahedrals. Currently, FEMATS required tetrahedral elements, so "2" should be entered, (in this case, the prismatic elements are simply divided into tetrahedrons). The user will also be prompted for a color choice. If the different color is chosen, FEMATS will crash, so this should be treated as a cosmetic device only. Finally, the user is prompted for the number of layers of artificial absorber to be placed around the periphery of the mesh as a termination boundary. It has been found that 3 layers is generally adequate. Thus, if 9 layers of prisms were originally requested, and 3 layers of artificial absorber is chosen, there will be 6 layers of air between the target and the first absorber layer. Following these inputs, Prism will continue to process the mesh, and will write out a data file readable by the FEMATS preprocessors.

1.6.4 Mesh Post-Processing

1.6.4.1 Introduction

Following the generation of the 3-D mesh/computational domain for the target in question, the information contained in this mesh must be extracted and rearranged for consumption by the FEMATS solver(s). Control of this (possibly) complex process is available through the pre-processing interface shown in Figure 1.10. For meshes with inherent symmetry, reflections are available to minimize the mesh creation time. 2-D object processing is available for thin plates, and other termination schemes besides the artificial absorber scheme discussed above are also accessable. Finally, the progress of the various stages of the preprocessing is displayed in a scrolling window, and optionally logged to a file for future reference.

1.6.4.2 Detailed Descriptions

Mesh Reflections For large geometries with planes of symmetry. This option allows the user to define and mesh only the unique portion of the geometry, thus greatly speeding up the definition & meshing process. The rest of the geometry and mesh is generated via reflections across the appropriate planes of symmetry. There are three possible reflections shown in Figure 1.10, allowing the user to define and mesh at the minimum 1/8 of the actual geometry, and create the rest later. Each of the three reflections is done in sequence, the top first, the middle second, and the bottom third, and each operates on the results of the previous action. Only reflections in the coordinate planes are supported – no reflections across planes that intersect more than one axis.

Reflection Switch to turn that reflection on or off.

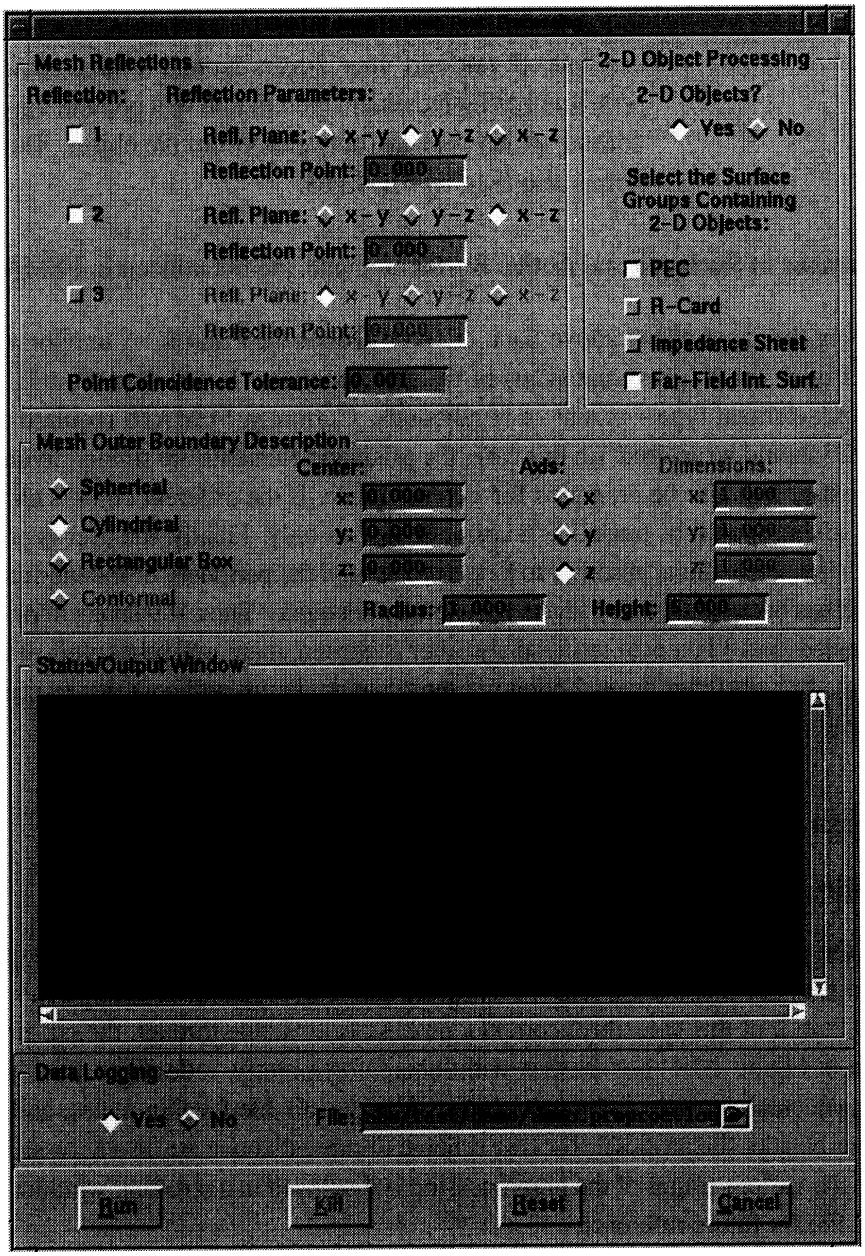

Figure 1.10: Mesh processing controls.

Refl. Plane The coordinate plane that the geometry and mesh will be mirrored across.

Reflection Point The location of the mirror plane. Alternatively, where the mirror plane, which is parallel to the plane formed by the two coordinate axes specified.

Point Coincidence Tolerance The minimum allowable separation between two individual nodes for them to be considered distinct, instead of coincident. Hence, nodes that are within this distance of the reflection plane will not be duplicated, while nodes that are farther away will be copied.

2-D Object Processing Allows FEMATS to handle thin objects, such as plates. For 3-D objects and when used with the artificial absorber termination, it should be turned off.

2-D Objects? Switch to turn 2-D processing on and off.

PEC Tells the preprocessor to look for 2-D (planar) PEC sheets, and group them accordingly.

R-Card Tells the preprocessor to look for 2-D (planar) r-card sheets, and group them accordingly.

Impedance Sheet Tells the preprocessor to look for 2-D (planar) impedance sheets, and group them accordingly.

Far-Field Int. Surf. When not using the artificial absorber termination, tells the preprocessor to group the far-field integration surface properly for 2-D structures.

Mesh Outer Boundary Description Only used when not using the artificial absorber termination on the outer boundary. Allows the selection of different surfaces to apply the absorbing boundary condition on. The shape of the outer boundary should be chosen to minimize the number of elements in the computational domain while still ensuring that it is large enough to allow accurate compution of the fields inside it. While this information could possibly be extracted from the actual mesh, it is faster and more accurate to query the user. NOTE: The outer boundary shape is determine when the mesh is generated, and only echoed here, so it is important to allow for this when the geometry and mesh are generated.

Spherical Selects a spherical-shaped boundary, with center coordinates and radius defined below.

Cylindrical Selects a cylindrical-shaped boundary, with center, radius, orientation, and overall length defined below.

Rectangular Box Selects a rectangular-shaped boundary, with center, orientation, and overall dimensions along each axis defined below.

Conformal Selects a boundary conformal to the outer surface of the object. Not currently implemented.

Center **x**, **y**, and **z** coordinates of the center of the geometric shape defining the mesh outer boundary.

Axis Axis along which the geometric shape forming the termination boundary lies.

Dimensions Overall size of the rectangular termination boundary.

Radius Radius of either the cylindrical or spherical termination boundary.

Height Overall length of the cylindrical termination boundary.

Status/Output Window Allows the user to monitor the progress of the preprocessors, and verify that the requested processing is being performed properly.

Data Logging Allows the user to log the information displayed in the status/output window to a file for future reference.

Yes/No Turns data logging on and off.

File Allows the user to select which file the log will be written to. A file requestor dialog is used, and the FEMATS GUI makes an appropriate suggestion for the name, which the user may either accept or redefine. If a file is chosen that already exists, any new information will be appended to the original file.

Controls: Run After the controls have been set and the appropriate selections made, click this button to run the preprocessors.

Controls: Kill Inactive until the preprocessors are running. Once they have started, clicking on this button will halt the preprocessing of the mesh file, forcing it to be started over from the beginning. Useful if an error is discovered while monitoring the output of the preprocessors — the process may be halted, the error corrected, and the preprocessing restarted, instead of waiting for it to finish before making the necessary corrections.

Controls: Reset Resets all the options and inputs to their default values.

Controls: Cancel Cancels the operation, and closes the window. Also used to close the window after the preprocessing has been completed.

1.6.5 Material Properties

1.6.5.1 Introduction

While the geometry is being entered and the mesh defined, different tags are used to indicate each material. However, because most geometry generators don't support the sort of information required by FEMATS, the electrical parameters for each material must somehow be defined externally. In short, for each dielectric region and for each resistive or impedance sheet, their constitutive parameters must be defined and saved for input to the FEMATS solver(s). Figures 1.11, 1.12, & 1.13 show the three dialogs used to define the constitutive parameters for the different materials mentioned above. To select each of the input pages, click on the appropriate tab inside the top left edge of the window, and the associated page will appear.

1.6.5.2 Detailed Descriptions

Dielectrics

A list of the different dielectric materials found by the preprocessors is given in the display window in Figure 1.11. Material 1 is internally defined as air, and Material 2 is the artificial absorber, also defined internally. Any of the parameters may be modified by clicking on the desired material in the list to select it, and then by modifying the appropriate value and clicking on **Done**. The modifications will then appear in the list. If, while the parameters are being modified, the user decides not to continue, the **Cancel** button may be clicked, and the edits to that point will be ignored and the window closed. The **Reset** button resets all the parameters to their original values, but doesn't close the window. The **Ok** button saves the changes, and closes the window.

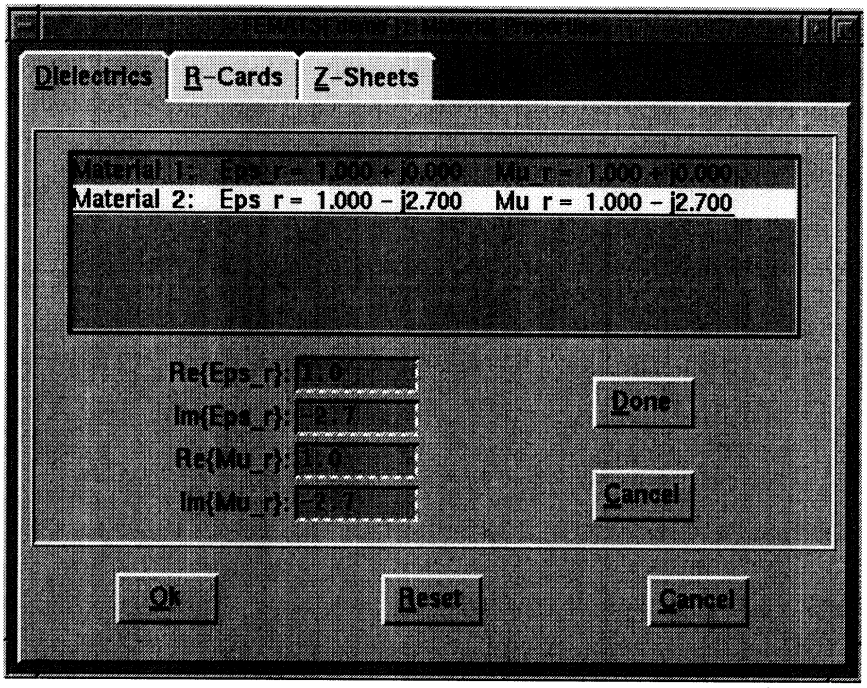

Figure 1.11: Material properties selection for dielectrics.

R-Cards

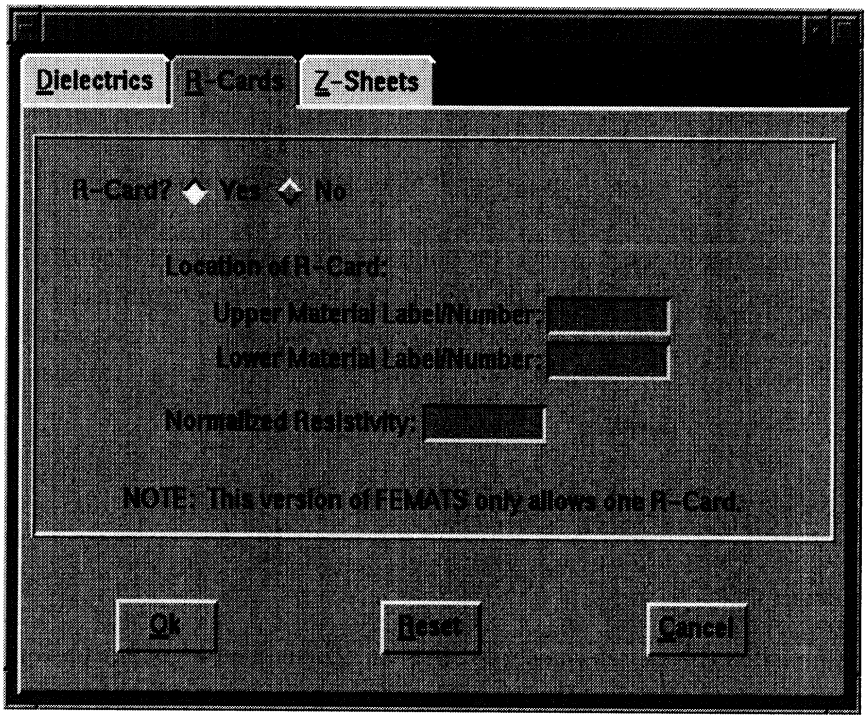

Figure 1.12: Material properties selection for resistance cards.

Figure 1.12 shows the entry dialog for r-cards. As is noted, FEMATS currently supports just one r-card. To define and use this r-card, select the **Yes** radiobutton. The two material regions the r-card is sandwiched between can then be specified. The r-card is defined on the boundary between

two volumes, not as a volume itself, because it is typically very thin compared to a wavelength. The r-card's resistivity must also be defined, in terms of normalized resistivity — that is, resistivity in $\Omega/\square$, normalized by the impedance of free space, $120\pi\ \Omega$. As before, the **Cancel** button ignores all the edits to that point, and closes the window. The **Reset** button resets all the parameters to their original values, and the **Ok** button saves the changes before closing the window.

Impedance Sheets

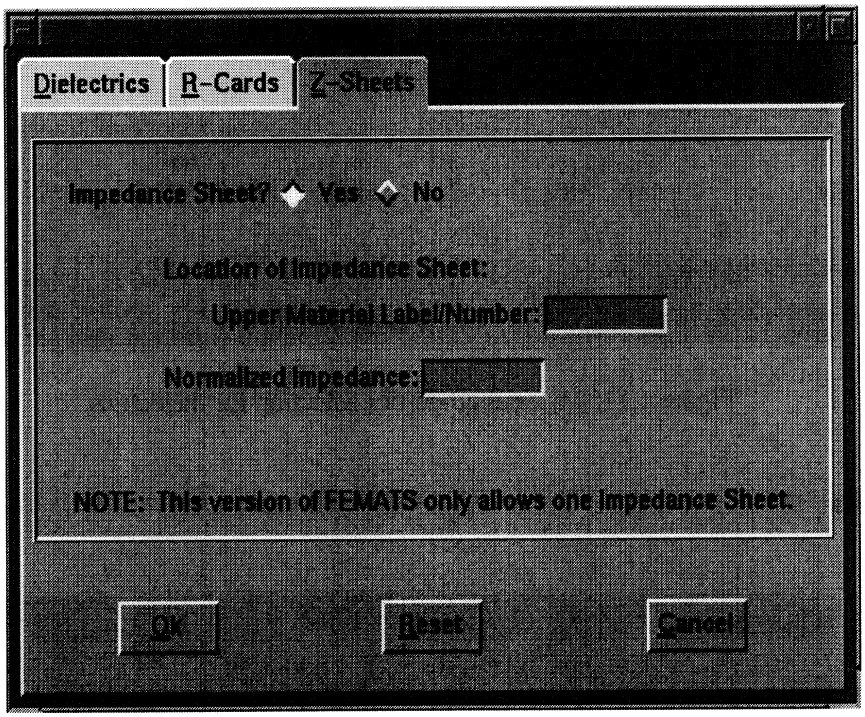

Figure 1.13: Material properties selection for impedance sheets.

The entry dialog for impedance sheets is quite similar to that for the r-card, as is shown in Figure 1.13. It is slightly different in that only the top material region number is required, instead of both the top and bottom, as above. Also, as indicated by its name, the impedance may be complex, but still must be normalized by the impedance of free space. The buttons operate as discussed above for the r-card box.

1.7 Run Menu

1.7.1 Overview

Before the simulation can be run, most of the so-called "simulation parameters" must still be entered — solver parameters, incident and far-field information, polarization, etc. Some facilites must also be provided to the user for control over the solution as it progresses. In the **Run** menu, access to the geometrical & electrical paramters is provided through the **Define Runtime Parameters...** dialog. Both informative and regulatory solver parameters are made available in the **Define Solver Parameters...** dialog. A runtime interface to the solver for the local machine is provided under **Run Locally...**. Remote access to off-site computational resources will be available under **Run Remotely...**, but is still under development. Because a substantial amount of information is

required to automate remote access to other machines, a user-friendly interface will be provided under **Remote Setup...** to facilitate its input.

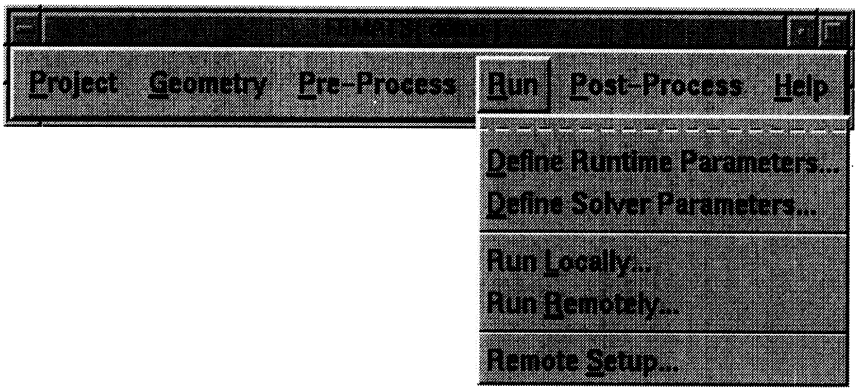

Figure 1.14: Run menu

1.7.2 Detailed Descriptions

Define Runtime Parameters... Opens a dialog window requesting all manner of information regarding the type of calculation to be made (Mono- or Bi-static), the incident field parameters, and both the incident and observation points.

Define Solver Parameters... Opens a dialog window that gives various statistics regarding the size of the problem, and allows the user to either accept the automatic solver tolerance and iteration limits, or to enter their own.

Run Locally... Opens a window that displays the status and progress of the solver, provides data logging capabilities, and offers some measure of control over the solver.

Run Remotely... Opens a control interface to another computer, providing status displays and control over the solver running on that machine.

Remote Setup... Setup screens for the remote solver control function, above.

1.7.3 Runtime Parameters

1.7.3.1 Introduction

Before the actual simulation of the target, all the geometrical and electrical parameters that define the simulation must be set. This data is collected in the user dialog shown in Figure 1.15 or Figure 1.16. Available settings include the pattern type, incident field polarization, and both incident and observation angle settings and sweeps.

This dialog reconfigures itself depending on whether a bistatic or monostatic pattern is chosen. In Figure 1.15, it is configured for a monostatic pattern. Figure 1.16 shows the same dialog after it has been reconfigured for a bistatic pattern.

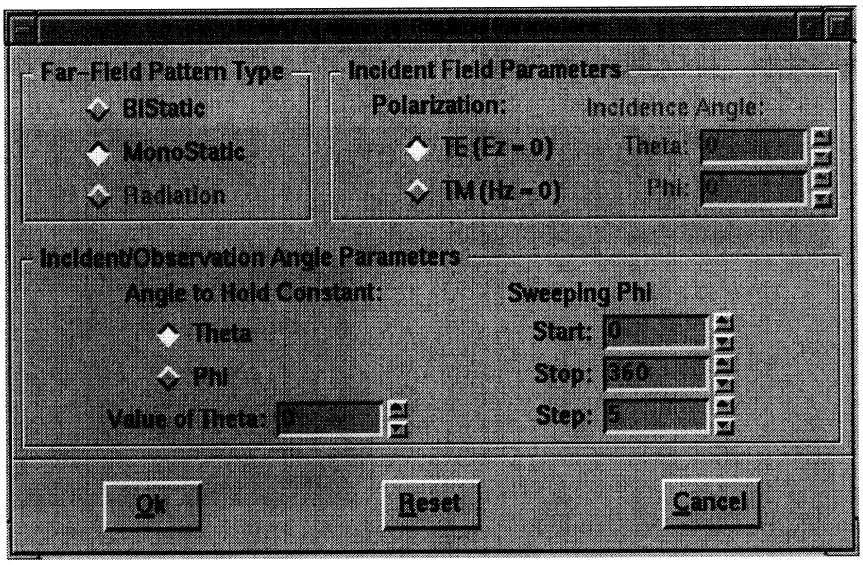

Figure 1.15: Interface to set runtime parameters for monostatic run.

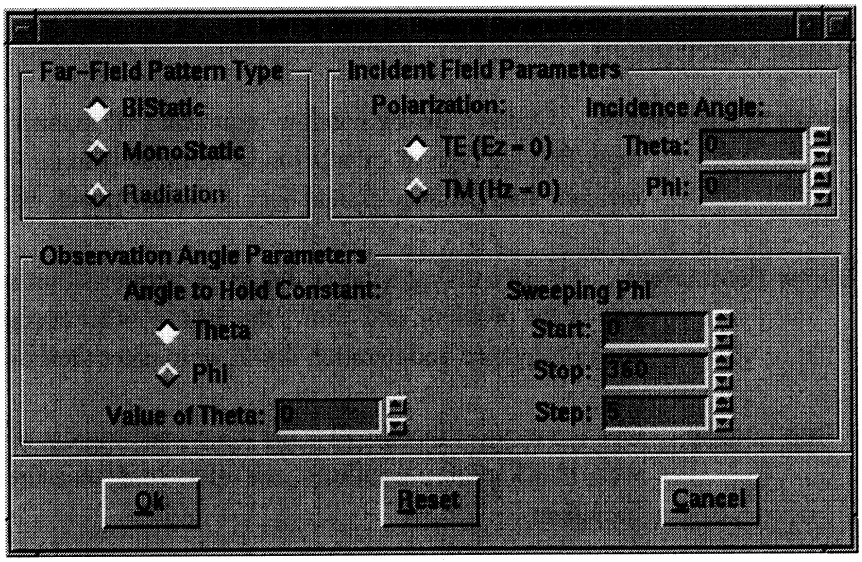

Figure 1.16: Interface to set runtime parameters for bistatic run.

1.7.3.2 Detailed Descriptions

Far Field Pattern Type Enables the user to define the type of far field pattern to be computed. Essentially, allows the user to specify whether the source will be independent or coupled to the receiver in the equivalent measurement.

BiStatic Bistatic pattern. The transmit antenna is fixed, and the recieve antenna follows the cut as defined in Figure 1.16.

MonoStatic Monostatic pattern. Both the transmit and receive antennas follow the cut as defined in Figure 1.15.

Radiation Not implemented yet.

Incident Field Parameters Lets the user define the polarization state of the incoming plane wave and the bistatic incidence angle, if a bistatic pattern is chosen.

Polarization Defines the polarization state of the incoming plane wave. In 3-D space and spherical coordinates, for TE polarization, **E** is along $\hat{\phi}$, while for TM polarization, **E** is along $\hat{\theta}$, and has some component along $\hat{z}$. In both cases, $\hat{z}$, $\hat{\theta}$, and $\hat{\phi}$ are defined in the standard right-hand system, shown in Figure 1.17.

Incidence Angle For a bistatic pattern, defines the direction from which the plane wave excitation will approach. For a monostatic pattern, this option is not available (compare Figures 1.16 and 1.15).

Incident/Observation Angle Parameters For monostatic patterns, where the transmit and receive antennas are co-located (Figure 1.15).

Angle Held Constant Chooses and defines the angle to be help constant in the cut. If **Theta** (θ) is held constant, a conical cut is defined, with the axis of the cone along $\hat{z}$ and the cone half-angle $\alpha = \theta$. If **Phi** (ϕ) is help constant, a planar cut is defined such that the it contains both $\hat{z}$ and $\hat{\rho}$.

Angle to Sweep Chooses the extents and number of points at which the fields are calculated, in whatever cut is defined.

Observation Angle Parameters For bistatic patterns, where the transmit antenna is stationary and the receive antenna moves. The direction along which the transmit antenna is positioned is determined by the **Incidence Angle** inputs under **Incident Field Parameters**, and is defined according to the standard spherical coordinate system, shown in Figure 1.17. The rest of the inputs are the same for the bistatic case as they were for the monostatic case, and are discussed above.

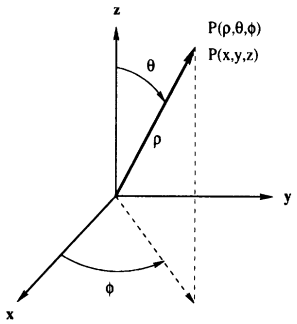

Figure 1.17: Standard Cartesian & Spherical coordinate systems.

1.7.4 Solver Parameters

1.7.4.1 Introduction

Once all the simulation parameters have been set in the **Runtime Parameters** dialog, before the FEMATS solver can be started, the accuracy and termination conditions for the solver must be set. The dialog box in Figure 1.18 provides some helpful information regarding the size of the problem, and allows the user to set the both the iteration tolerance and the maximum number of iterations.

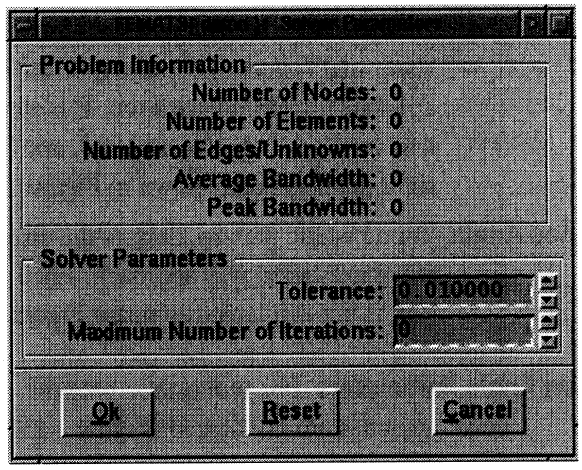

Figure 1.18: Interface to set solver parameters.

1.7.4.2 Detailed Descriptions

Problem Information To make an informed decision regarding the termination tolerance and the maximum number of iterations the solver should perform before terminating, it is convenient to have some information regarding the size and relative bandwidth of the system. The following values give some idea of the scope of the problem.

Number of Nodes Number of finite element nodes in the geometry.

Number of Elements Number of finite elements in the geometry.

Number of Edges/Unknowns Number of finite element edges in the geometry, or the actual number of unknowns in the numerical system.

Average Bandwidth The finite element system is a highly sparse system. The average bandwidth gives some idea of the width of the band of non-zero elements in the matrix. It also indicates the average coupling between elements.

Peak Bandwidth Indicates the width of the widest portion of the band of non-zero elements in the matrix.

Solver Parameters FEMATS uses an iterative solver which continues to fine-tune its answer until one of several termination conditions is reached. Two of these, the error tolerance and maximum number of iterations, are discussed below. The final termination condition is given by the solver itself — it will not iterate more than the total number of unknowns.

Tolerance For small problems, typically set between 0.0001 and 0.001. For larger problems ($>$ 100k unknowns), often set between 0.01 and 0.1. The solver iterates until the norm of the difference between the current residual error and that of the immediately previous iteration is less than this tolerance.

Maximum # of Iterations Typically somewhere between 1/10 and 1/100 the number of unknowns, depending on the problem size (the larger the

problem, the greater the fraction) and the system condition number. This forces (or only allows, depending on your outlook) the solver to perform a certain number of iterations, regardless of the residual error.

1.7.5 Local Runs

1.7.5.1 Introduction

After setting the solver parameters, and all the rest of the runtime values, the solver is ready to be run. Under **Run** in the main menu, clicking on **Run Locally...** brings up the user dialog/control panel shown in Figure 1.19. This displays the current status and monitors the output of the solver, controls the logging functions, and gives some measure of control over the solver itself by providing a termination mechanism for the solver.

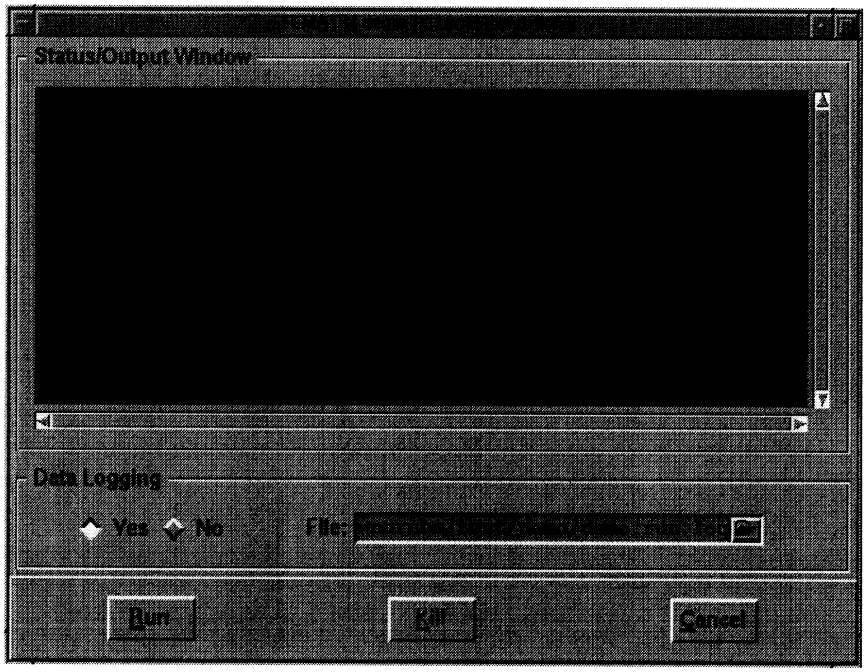

Figure 1.19: Control interface and status display for solvers.

1.7.5.2 Detailed Descriptions

Status/Output Window Allows the user to monitor the progress of the solver, and verify that the requested runs are being performed properly.

Data Logging Allows the user to log the information displayed in the status/output window to a file for future reference.

Yes/No Turns data logging on and off.

File Allows the user to select which file the log will be written to. A file requestor dialog is used, and the FEMATS GUI makes an appropriate suggestion for the name, which the user may either accept or redefine. If a file is chosen that already exists, any new information will be appended to the original file.

Controls:Run Once the status of the data logging has been determined, click this button to start the solver.

Controls:Kill Inactive until the solver is running. Once it starts, clicking on this button will terminate the solver, forcing it to be started over from the beginning. Useful if an error is dicovered while monitoring the initial output of the solver — if an error is discovered, the solver may be halted, the mistake corrected, and the solver restarted, instead of waiting for it to finish before making the necessary corrections.

Controls:Cancel Cancels the operation, and closes the window. Also used to close the window when the solver has completed.

1.7.6 Remote Processing

In the future, this ability will be added to facilitate the execution of FEMATS on other machine, either locally (in the next room) or half-way across the world. However, until this is ready, this option will remain inoperative.

1.8 Post-Processing Menu

1.8.1 Overview

Following the calculation of the scattered or radiated fields by the FEMATS solver, some facility must be provided to view the results. The **Post-Processing** menu in Figure 1.20 provides a first-level interface to several different visualization packages.

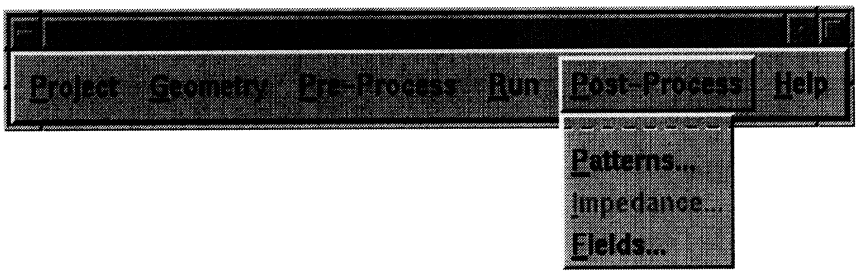

Figure 1.20: Post-Processing menu

1.8.2 Detailed Descriptions

Patterns... Starts XMgr, a very sophisticated 2-D plotting package. In this context, it is very useful for viewing and manipulating 2-D pattern plots.

Impedance... Not implemented yet.

Fields... Starts a 3-D viewer, which is used to display and manipulate the surface fields on the target.

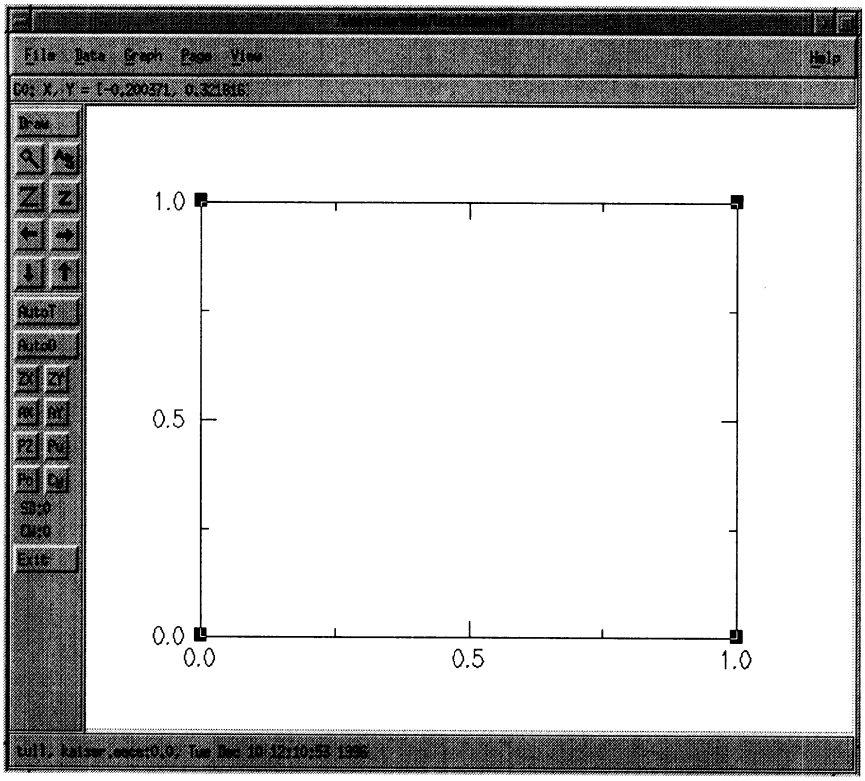

Figure 1.21: XMgr: 2-D plotting for radiation & rcs patterns.

1.8.3 Patterns: XMgr

1.8.3.1 Overview

XMgr is a public domain 2-D plotting package, developed by Paul J. Turner. Its initial look and feel is shown in Figure 1.21. It not only allows the simple display of line data, but also allows all sorts of operations to be performed on the current set of data, as well as across several data sets. Thus, not only can it be used strictly to view the data, but also for any sort of post-processing that the user might have in mind.

In the context of FEMATS, the data to be plotted is formatted internally by the FEMATS GUI, and is sent through a pipe to XMgr, which then displays it. The GUI also defines the initial scaling, titles, labels, etc. However, as mentioned above, XMgr is a full-fledged plotting package, and very capable, not to mention extremely customizable.

While XMgr is fairly intuitive to use, for further documentation regarding the more esoteric commands and operations, see the XMgr subdirectory in the documentation directory of the FEMATS source tree. (/I/EM/`femats/doc/xmgr`).

1.8.4 Impedance

Inoperative.

1.8.5 Fields

Inoperative.

1.9 Help Menu

1.9.1 Overview

At any time during the use of FEMATS, help is available under the **Help** menu, as shown in Figure 1.22. However, the help system is still in development, and until it is fully debugged, will remain inoperative.

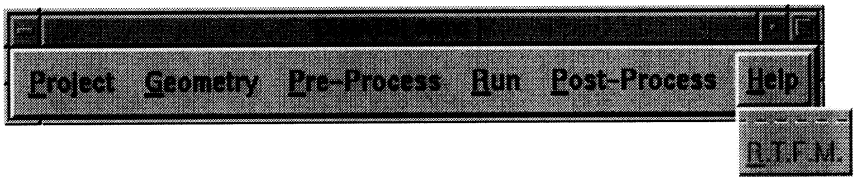

Figure 1.22: Help menu

Chapter 2

An Example Run using the GUI: The NASA 1.19λ Almond

2.1 Introduction

To further introduce the FEMATS GUI, and to give some idea of its intended use, the following example is worked through from start to finish. We choose a scaled version of the NASA almond as the target, both because it is a relatively low-observable object of reasonable current interest, and because it can be scaled down enough to be a reasonable, and yet still interesting, example problem.

In the process of simulating the radar scattering from some target of interest, the user will typically go through the following major steps:

1. Contruction of the target geometry
2. Generation of a mesh on the surface of the target
3. Generation of the 3-D computational domain
4. Processing of the 3-D mesh for input into the FEMATS solver
5. Specification of the constitutive parameters of the non-PEC materials in the target
6. Specification of the runtime parameters - source & observation angle, incident field, etc.
7. Submission of the job to the FEMATS solver
8. Review of the solution(s) generated by FEMATS

In general the user will create the geometry they wish to simulate with their favorite CAD package. However, it was deemed easier to avoid that process in this case, especially since the main objective of this discussion is the operation of the FEMATS GUI, and not solid modeling techniques. An ACAD facet file containing all the mesh information for this example has already been developed, and is located in the FEMATS source tree at /I/EM/`femats/bench/almond/almond.facet`. It is pictured in Figure 2.1. NOTE: A complete copy of all the files used and generated during this example may be found in /I/EM/`femats/bench/almond`, should the user feel inclined (or need) to peruse them.

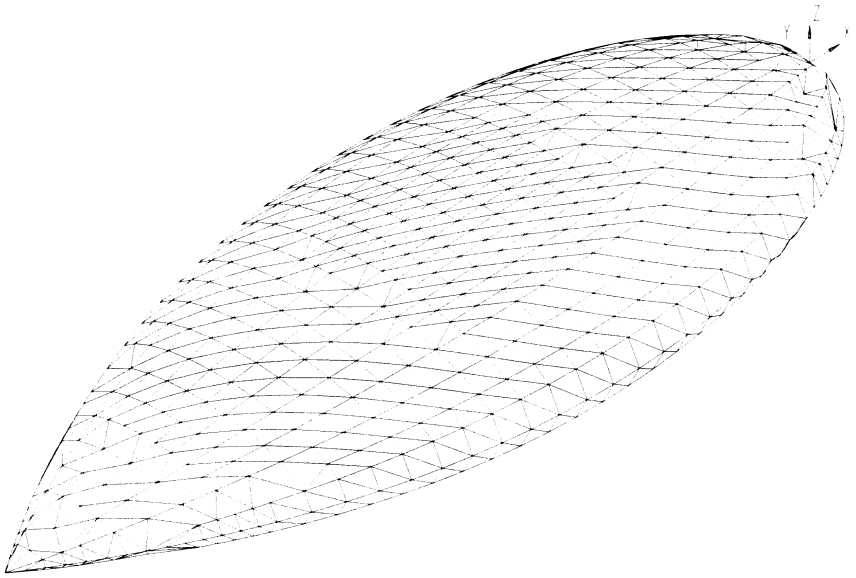

Figure 2.1: NASA almond facet file, from ACAD.

As mentioned above, both the geometry and mesh that will be used in this example were generated using the (originally) Lockheed Fort Worth CAD package ACAD (**NOT** Autodesk's AutoCAD). ACAD uses an associative database, which, coupled with both a capable solid modeling facility and good surface modeling capabilities, makes it a very powerful package. It also produces reasonably good triangular and rectangular surface grids, although they are not optimized for electromagnetic analysis.

2.2 Getting Started

In the pursuit of organization and neatness, it is highly recommended that the FEMATS user make a separate (sub)directory for their simulations; somewhere in their user space, and definitely separate from the main FEMATS source and binary tree. FEMATS can also be a bit of a disk hog, particularly for big problems, so depending on how much data from previous simulations, etc., is kept around, 50-100 MB of work space might be considered a minimum. Given these recommendations, for this example the following paths will be assumed (not because there is anything special about them, but to minimize confusion by making sure everything is well-defined).

1. The FEMATS source tree is located in /l/EM.
2. The user's work directory is /l/mwnurnbe/work.

(Realizing that these paths will most likely not be valid on the user's system, the system-dependent portion of the path will be typeset in a sans serif font, making it stand out from the rest of the path. This makes it more obvious which portion of the path the user needs to replace with a similar portion that is valid on their own system.

After making a separate (sub)directory to work in, `cd` to that directory, and run FEMATS by typing `femats` at the prompt. Assuming everything went right in the installation, and that the paths are set properly, a window like that shown in Figure 2.2 should appear in the upper-right quadrant of the screen.

Before anything else can be done, a project must be defined. As was discussed in Section 1.4.1, the FEMATS GUI will not allow any other actions until either a new project is defined or an old

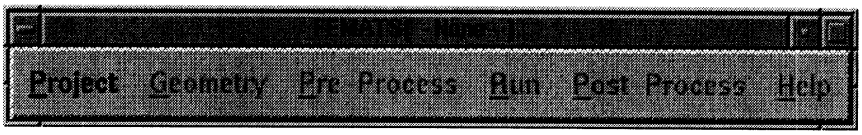

Figure 2.2: FEMATS Main Menu, with no project selected.

project is reloaded. From the **Project** menu, select **New...**, since a new project is being started. A file requestor window will appear, prompting for the name for the new project. Following the thinking that a descriptive name is best, in the entry field labeled **New Project:**, enter `almond`, (see Figure 2.3) and then click on **OK**.

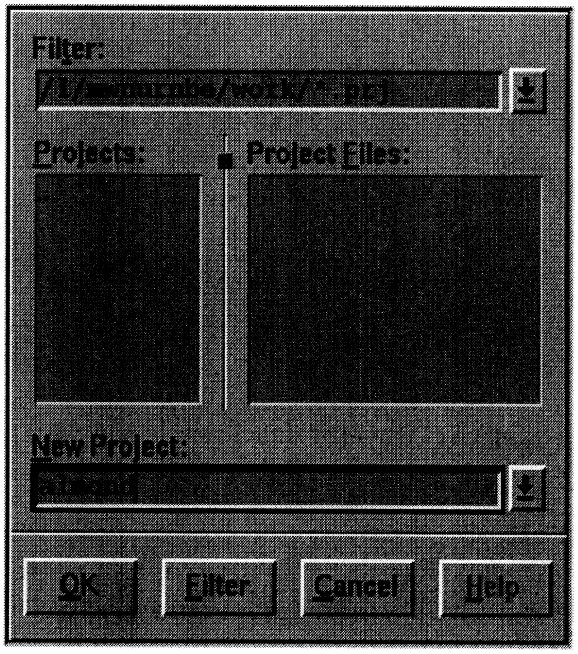

Figure 2.3: Defining a new project named `almond` in the New Project file requestor.

The FEMATS main menu will still be mostly grayed out since, as was discussed in Section 1.4.1, defining a new project only initializes the project database. The project must also be loaded in to FEMATS before anything else can be done. To do this, from the **Project** menu, select **Open...**, choose the project that is to be worked on — in this case, `almond`, and click on **OK**. (The name of the project, in the list under **Project Files**, can also be double-clicked to automatically load it.) This is shown in Figure 2.4.

Once a valid project is loaded, and the project database initialized, the rest of the FEMATS Main Menu will cease to be grayed out, indicating that the menus are accessible, and that all the functionality of FEMATS is available. These changes may be observed by comparing Figure 2.5 with Figure 2.2. Also worth noting is the change in the title of the main menu window (and all the subsequent windows). Again refering back to Figure 2.2, the original title was **FEMATS**{ **–None–** }. Now, after loading a project, the project name, `almond`, is displayed in place of **–None–** . This is the case for all the windows, and helps the user keep track of which project is being worked on, particularly if more than one copy of FEMATS is being run at a time.

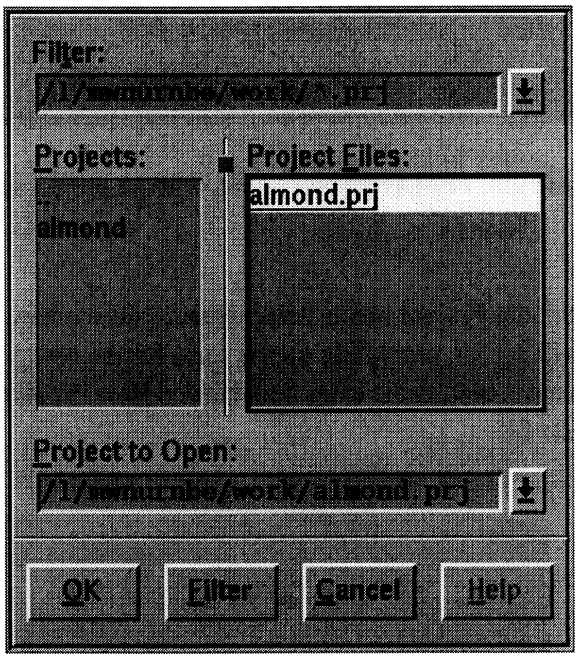

Figure 2.4: Loading the `almond` project.

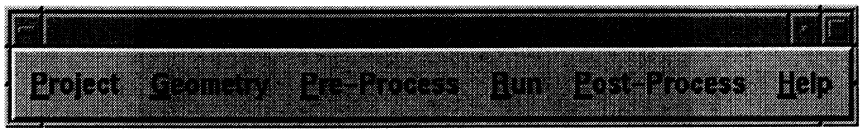

Figure 2.5: FEMATS Main Menu, after selection of the `almond` project.

2.3 Mesh Generation

According to the list in Section 2.1, after starting the interface and defining the project, the next step is Step 1, construction of the target geometry. Step 2, the generation of the surface mesh for the target, follows. However, because this is an example run, with a previously defined target geometry and surface mesh, these steps will be skipped. Instead, the FEMATS GUI will be fooled into thinking that the geometry has already been created and meshed. To do this, copy the file named `almond.facet` from the /I/EM/`femats/bench/almond` directory to the directory named `almond` in your current working directory. Using the above-mentioned paths, to do this, you would type

```
cp /I/EM/femats/bench/almond/almond.facet almond
```

For all intents and purposes, this takes care of Steps 1 & 2. Using the surface mesh provided in the sample geometry (created in ACAD), the grid generator Prism will be used to generate a 3-D grid inside which the fields will be computed, satisfying Step 3. To do this, under the **Pre-Process** menu, activate the meshing submenu by clicking on **Generate Mesh....** From the list of meshing packages, choose **Prism**. This will start the Prism meshing package, and bring up its GUI, as shown in Figure 1.9. Following the discussion in Section 1.6.3, edit the input fields until they are same as those in Figure 2.6.

It is worth noting that, for this example, the grid generator has been instructed to generate 9 layers of elements, each 0.05λ thick. For an in-depth discussion of each entry field, please see Section 1.6.3.2. An example mesh is shown in Figure 2.7, where a view of the almond is shown with

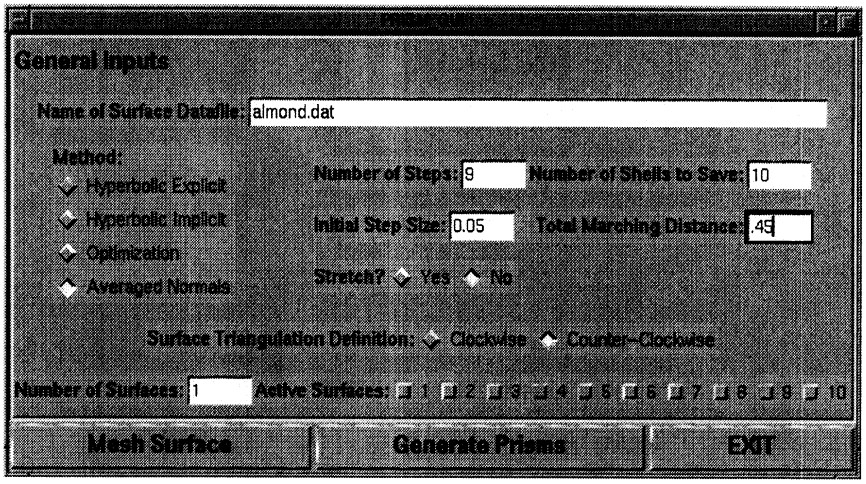

Figure 2.6: Settings for the Prism grid generator.

just one layer of prisms around it (partially cut away).

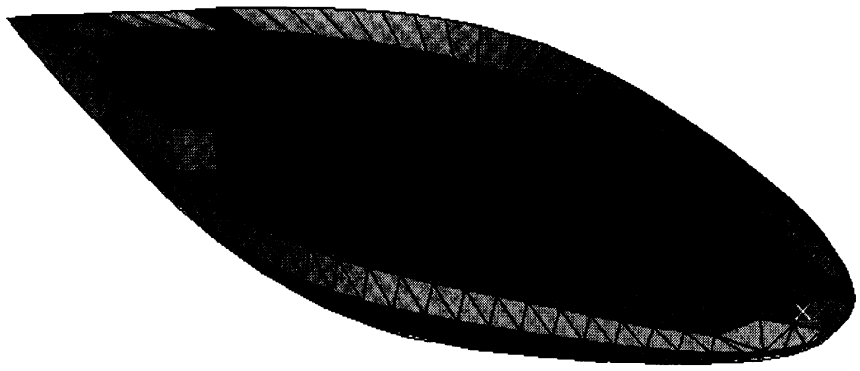

Figure 2.7: An example mesh of the almond, showing only 1 layer of prisms.

Once all the fields are properly entered, press the center button, labeled **GENERATE PRISMS**. First, this starts a program to translate the ACAD facet file format to the Prism input file format. It then invokes Prism to "grow" the mesh around the target. Another window will appear, keeping the user updated as to the status of the grid generation. It will also prompt the user regarding several issues, as shown in the following transcript of the Prism run. (The inputs required from the user are shown in bold, as is a short description of each.)

Transcript of Prism run:

```
Number of Surfaces to be Treated =  1
MAXNE =  1420
MAXNN =  712
NSTEPS =  10
INITIAL DZETA =  5.00000E-02   ZETA MAX =  .4499999
RMU =  .0
    2    .500000E-01    .500000E-01
    3    .500000E-01    .100000E+00
    4    .500000E-01    .150000E+00
    5    .500000E-01    .200000E+00
    6    .500000E-01    .250000E+00
    7    .500000E-01    .300000E+00
    8    .500000E-01    .350000E+00
    9    .500000E-01    .400000E+00
   10    .500000E-01    .450000E+00
```

```
Shell   2
Shell   3
Shell   4
Shell   5
Shell   6
Shell   7
Shell   8
Shell   9
Shell  10
 Output 1) prisms or 2) tetrahedrals?
2                                    <=== Choose tetrahedral elements.
 Display shell #1 in different color (1=yes)?
0                                    <=== Don't highlight shell #1.
 Number of layers for artificial absorber (<=  9):  3    <===
  Edge count = 2130                                    # of Layers of AA.
 Elements - prismatic: 12780
 Elements - tetra: 38340
 Writing Universal File . . .

 Output file is almond.unv.

Searching for element dataset...Done.
Searching for artificial absorber layers...Done.
Changing material parameters for artificial absorbers...Done.
Performing automatic grouping...Done.
```

End of Prism Transcript.

Approximately one-half of the way through the transcript, Prism gives the user a choice of elements – either prisms or tetrahedrons. Internally, Prism generates elements that are distorted triangular prisms. However, FEMATS is not yet equiped to deal with them. To deal with this, the user needs to specify tetrahedral elements instead of prismatic elements when prompted (see above transcript).

Immediately following the prompt for element type, Prism asks the user if they want to display shell #1, which corresponds to the surface of the scatterer, in a different color. This option is useful for debugging, and pertains to I-DEAS, another geometry generator/visualization package. However, it will make the FEMATS mesh processors crash, so it should always be set to **0** (see above transcript).

The last prompt is for the number of layers of absorber. This absorber is used to terminate the computational domain. In this example, a total of nine layers of prismatic elements were called for. In the above transcript, three of these nine layers were dedicated to the absorbing layer, leaving six layers of actual free space. In other terms, the target is surrounded by approximately 0.3λ of free space, which is then surrounded by 0.15λ of absorber.

After the user has answered these three prompts, Prism makes the appropriate modifications to the data file and exits, closing the status window. The Prism GUI is still running, in case the user wishes to make any changes. However, for this example, there should be no modifications, and Prism should have made a valid mesh file. To close the Prism GUI, click on **EXIT**.

2.4 Mesh Processing

The next step in the simulation of the target is to process the grid generated by Prism, converting it into a form that is understood by the FEMATS solver. Again, under the **Pre-Process** menu, start the mesh processing software by clicking on **Post-Process Mesh...**. This brings up the control interface shown in Figure 2.8.

As was discussed in Section 1.6.4, this interface makes available many different processing options, including 2-D objects, geometry and mesh reflections, and various automatic boundary de-

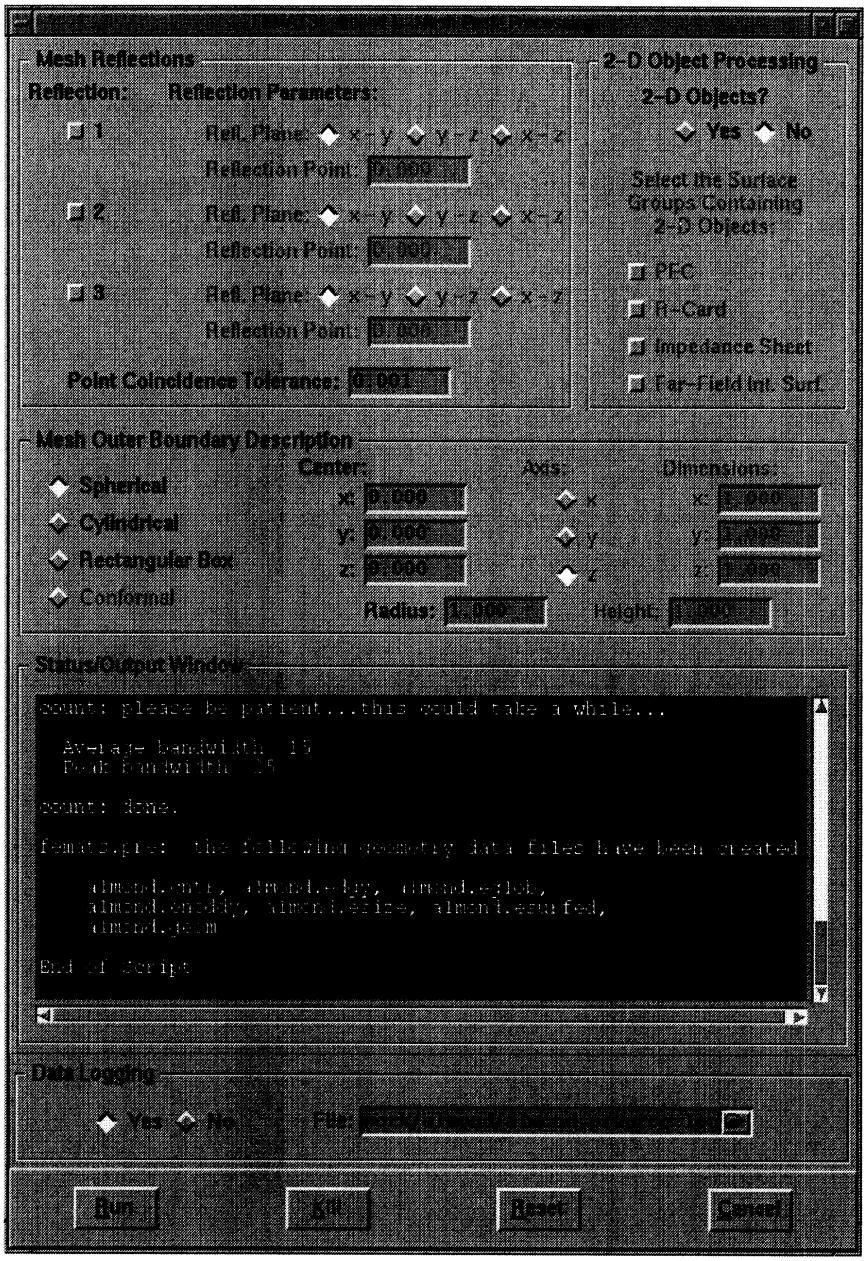

Figure 2.8: Settings for the mesh processing controls.

scriptions. For this demonstration, however, most of these options will be ignored. Hence, ensure that all the options are set to their defaults: all the mesh reflections are turned off, that the 2-D object switch is turned off, and that a spherical outer boundary is chosen.

The only option that will be used for this simulation is the **Data Logging**, at the bottom. By default it is turned off, so turn it on by clicking on **Yes**, and then select a log file. This may be accomplished either by typing in a path and filename, or by clicking on the browse button at the far right of the dialog window. This will bring up a file requestor, and will suggest an appropriate name. It is recommended that the user choose the browse option, and that the suggested name be used, as it keeps the naming convention intact. It is, however, up to the user.

It is also recommended that the user save the project at this point, and at every convenient point following this, as the next steps are often troublesome. To do this, under the **Project** menu, click on **Save**. This ensures the project file on disk is up-to-date, just in case something breaks.

Once the log file has been chosen, click **Run** at the bottom of the window. At this point, two things will happen. The adjacent **Kill** button will become active, and the mesh processors, as they run, will start writing status reports both to the log file and to the **Status/Output Window**. At any point while the mesh processors are running, if an error is doscovered, or for whatever reason, they may be killed by clicking the **Kill** button. Eventually, as shown in Figure 2.8, the user is informed that the mesh processors have finished running. At this point, the **Cancel** button can be clicked, and the next step begun.

A copy of the log file for this run is included in Appendix A.3.

2.5 Materials Specification

After the mesh has been processed, the various constitutive parameters must be assigned to each material. The preprocessors are aware of the presence of different materials, but most geometry generators don't support the sort of information required by FEMATS, making some sort of external means of defining these parameters necessary.

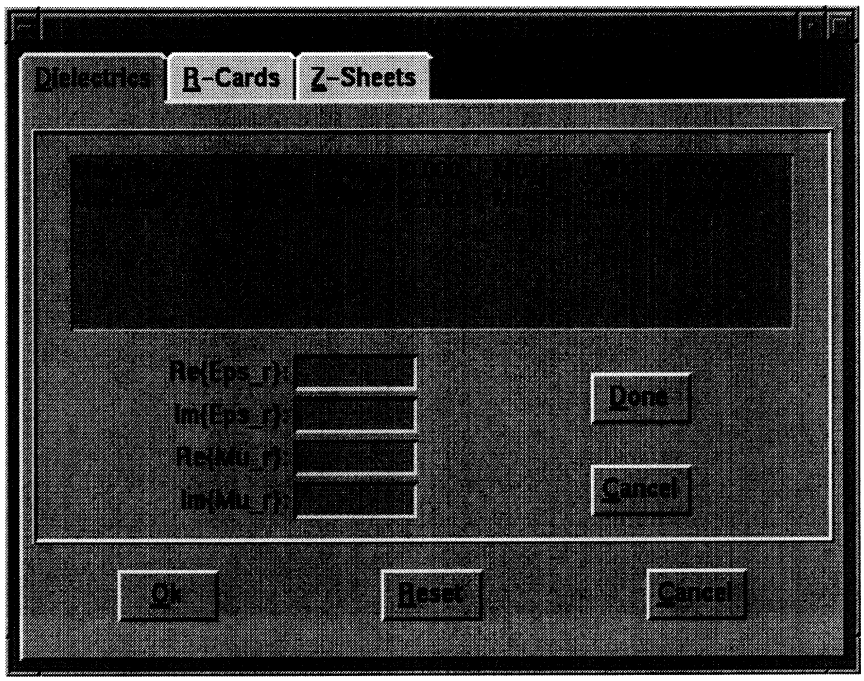

Figure 2.9: Setting the constitutive parameters for each material.

A list of the different materials found by the preprocessors is given in the display window in Figure 2.9. In this case, they have (properly) only found two materials – air, and the absorber layers. For these materials, default values are given for both the permitivity and permeability. In the case of the absorber, these are the values that have been determined to give the best absorbtion for the thinest absorber layer. Since the defaults are adequate in this case, there is nothing to do, so close the window by clicking **Cancel**, and move on to the next step.

2.6 Simulation Parameters

After all the target geometry has been defined, and the materials chosen, the actual simulation can be set up. This involves determining runtime parameters like the angle and polarization of the incident

field, the scattering pattern type, and the locus of observation points (Figure 2.10). It also includes setting up the parameters for the interative solver (Figure 2.11).

2.6.1 Runtime Parameters

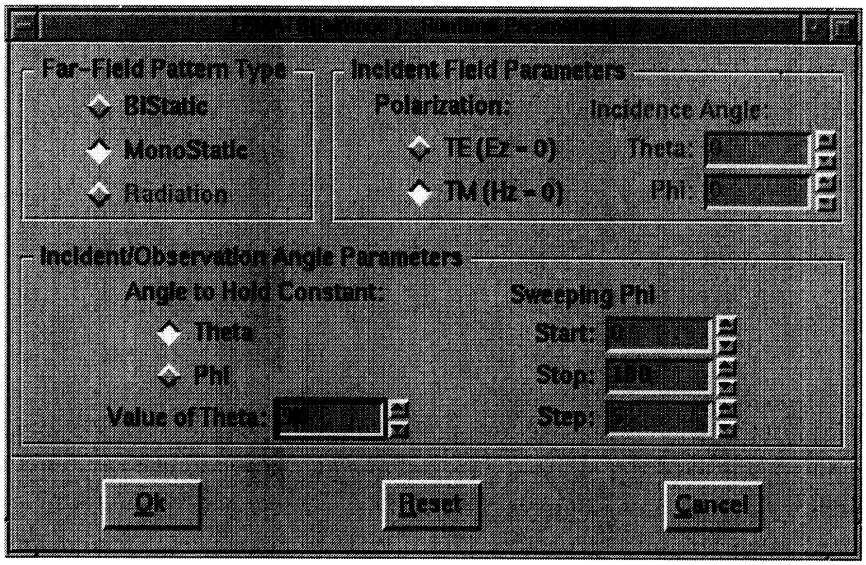

Figure 2.10: Runtime parameters for a monostatic scattering from the almond.

Before the simulation can be run, all the excitation and the observation parameters must be defined. Figure 2.10 shows these parameters for the almond example. Briefly, a monostatic pattern is selected under **Far-Field Pattern Type**. The incident field is TM-polarized, and, since the transmitter and receiver are co-located, the incident and observation angles are the same. In this case, a cut at $\theta = 90°$ (a cut in the $x - y$ plane) is defined, for $0 \leq \phi \leq 180$, in steps of $5°$ (see Figure 1.17 for a coordinate system diagram).

Ensure that the values have been entered properly. If mistakes are made, they may either be individually corrected, or, if either the user or the GUI gets confused, the **Reset** button may be pressed, and all the settings will return to their default values, and the proper values may be entered. Once all the user-entered values match those shown in Figure 2.10, click **Ok** to close the window and move on. Again, it is recommended that the user save frequently (Now is a good time...Hint Hint).

2.6.2 Solver Parameters

FEMATS uses a sparse, iterative solver because of its increased efficiency and speed. However, to make the best use of the extra speed, a couple of parameters need to be set. Figure 2.11 shows both these two parameters and the information available to help with their choice. This is more fully discussed and explained in Section 1.7.4. For the moment, both the **Tolerance** and the **Maximum Number of Iterations** should be set to the values in Figure 2.11. As above, the **Reset** buttom may be pressed to start over with the default values. (Don't forget to **Save**...)

2.7 Running the FEMATS Solver

Now that all the geometrical and simulation information has been entered, the target can finally be simulated. Under the **Run** menu, choose **Run Locally...**. A window will appear, containing both

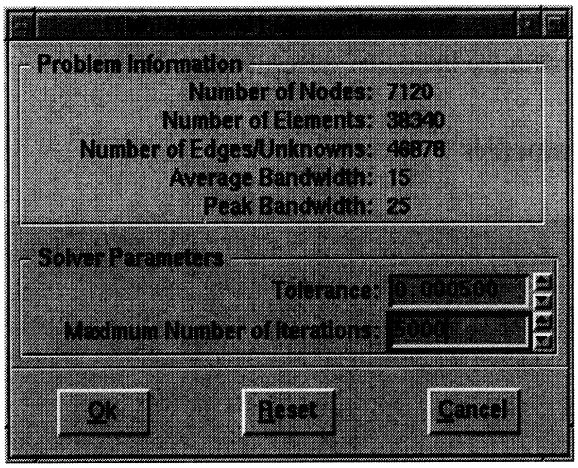

Figure 2.11: Solver parameters for monostatic scattering from the almond.

a status window and a data logging section, along with control buttons for the solver. As with the mesh processing, the solver output may be logged to a file as well as echoed to the status window. This is controlled from the **Data Logging** portion of the window, as discussed before, in Section 2.4. Control over the solver is provided again though the **Kill** button while the solver is running. To start the solver, press **Run** (**Save...** first...).

During the run, the solver will first display some statistics for the problem, and then echo back the runtime information input by the user. It then periodically updates the user on its progress, displaying the current angle, convergence information, timings, and results. For comparison's sake, the timings displayed in Figure 2.12 are for an otherwise unloaded hp 9000/715-75 workstation.

A copy of the log file for this run is included in Appendix A.3.

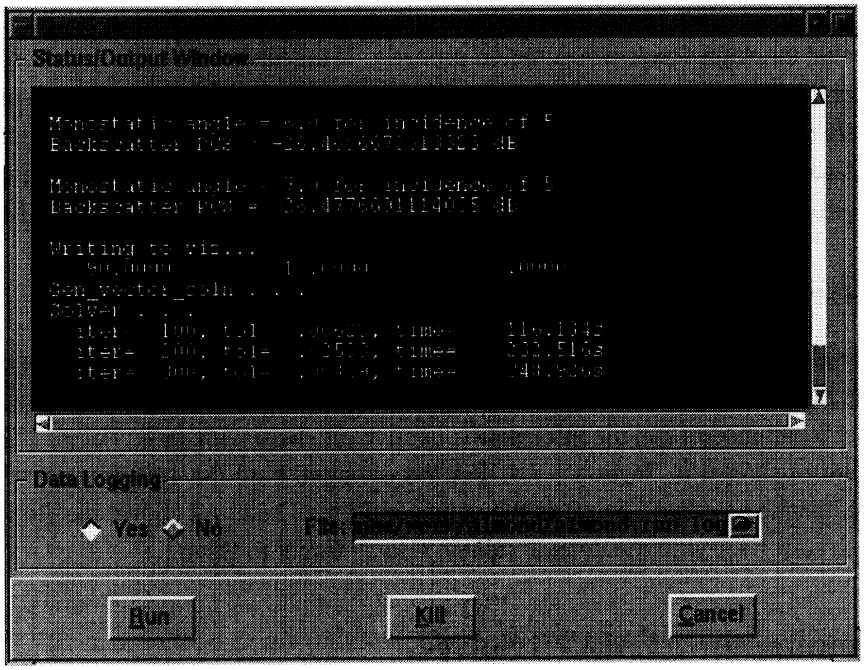

Figure 2.12: FEMATS solver control interface during almond run.

2.8 Data Postprocessing

After the solver finishes, it saves the data to disk in ASCII format. This data can then be imported into other packages for further analysis or display, or it can be viewed and processed with the packages available through the FEMATS GUI.

For 2-D plotting, the FEMATS GUI makes available the XMgr package, a fully functional 2-D plotting and analysis package. A more in depth discussion of its capabilities is available in Section 1.8.3.1, and in the references contained there-in. As an example of its capabilities, XMgr will be used to make the backscatter plot for the almond simulation. Under the **Post-Process** menu, choose **Patterns**. XMgr will start, presenting the user with an interface similar to the one in Figure 1.21. A moment or two later (it depends on the amount of data to be transfered from the FEMATS GUI to XMgr), the requested plot will appear. In this case, the final plot should look remarkably similar to that shown in Figure 2.13.

The plot in Figure 2.13 may be printed either by doing a window grab, or by using the XMgr interface to generate a Postscript file. It may also be manipulated inside XMgr, exported to another package for manipulation with other data, or that other data can be imported into XMgr for manipulation as well.

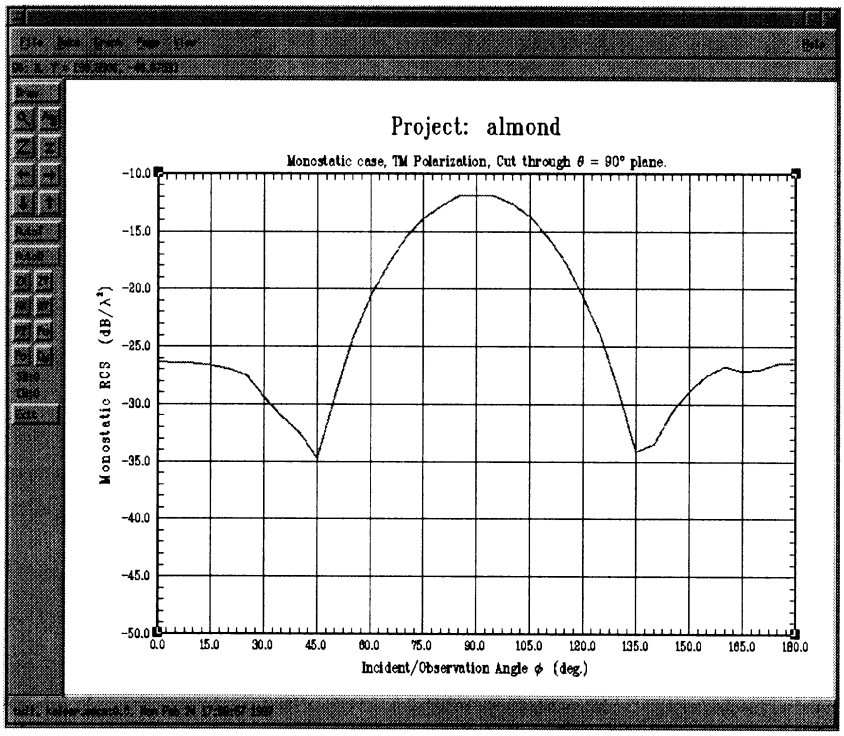

Figure 2.13: Monostatic RCS for the Almond.

Chapter 3

Installation

3.1 Introduction

The installation of the FEMATS package is designed to straight-forward and easy, and shouldn't require any uncommon knowledge about the host computer system. While FEMATS has been ported to many different supercomputers, this version of the GUI and FEMATS is intended for use on a workstation. More specifically, the following installation procedure will assume that you are using an hp 9000/700-series workstation, or similar machine. However, the GUI, FEMATS, or both may be quite easily ported to another type of machine.

3.2 Installation Instructions

1. Place the distribution tape in the tape drive. If the drive is not the default system drive, you will need to find out what device it is, and include it in the following `tar` command.

2. Retrieve the files from the tape to the appropriate directory. The following command will create a directory structure named `femats`, under which the FEMATS package will reside. Change to the subdirectory where you want this directory structure to be located, and type the following command:

   ```
   tar x * .
   ```

   For example, if the desired location of the head of the FEMATS package is /l/EM/`femats`, you would type

   ```
   cd /l/EM
   tar x * .
   ```

   This would create the directory /l/EM/`femats`, and place the contents of the tape in it.

3. Change directory into `femats` and edit the Makefile, changing the line that says

   ```
   ROOT = /12/femats/femats
   ```

   to reflect the actual location of your FEMATS installation. For example, in the above case, after editing the line would read

   ```
   ROOT = /l/EM/femats
   ```

4. Staying in the `femats` directory, type

```
make install
```

to build the various components of the FEMATS package. This step may take anywhere from 15 minutes to more than an hour, depending on your machine. Once that has completed, type

```
make docs
```

to build the documentation.

5. After the successful completion of these steps, follow the instructions printed after `make` has finished. They will tell you what to add to your path(s), and what links must be installed.

3.3 Some Possible Difficulties

1. **Kernel Parameters on hp 9000/700-series machines**

   It seems that the default kernel configuration in hp-ux 9.* is rather conservative in its allocation of, among other things, stack space. This is particularly true if the machine that FEMATS is running on has much more than 64 MB of RAM. If you receive an error that says something like:

   ```
   Pid ##### received a SIGSEGV for stack growth failure.
   Possible causes: insufficient memory or swap space,
   or stack size exceeded maxssiz.
   Segmentation fault (core dumped)
   ```

   it is likely that certain portions of the operating system kernel need to be reconfigured. In particular, the kernel parameters `maxdsiz`, `maxssiz`, and `maxtsiz` probably need to be enlarged. `Maxswapchunks` may also need to be increased. Finally, it may be useful to look at defining the FEMATS solver as an EXEC_MAGIC user executable; refer to `ld(1)` in the HP-UX Reference Manual for more information. The manual "How HP-UX Works, Concepts for the System Administrator" (Manual Part No. B2355-90029) might also be useful.

   If the user has root permission on the machine, this may be done with SAM, the HP-UX System Administration Manager, or by hand, depending on the level of experience. Otherwise, it should be refered to someone with the required password and experience. Building a new kernel is not hard, but it is picky, and without the proper preparations, can be disasterous if something goes wrong.

2. **Script Path Length/Location of the FEMATS source tree**

   A good part of the FEMATS GUI is written in a scripting language called Tcl. In a round-about way, this places certain restrictions on where the FEMATS source tree can be located. Most of the unix shells only allow the first line of an executable script (the path and name of the interpreter,) to be 30 characters long. Thus, because most of the GUI is made up of scripts, the path (including the name) to the Tcl interpreter may only by 30 characters long.

   To get around this difficulty, a link named `femats` that points to the head of the FEMATS tree, wherever it is located, is created as part of the installation process. Thus, instead of having `/l/mwnurnbe/femats/bin/tixwish-tk4.1` as the path (which is too long, even though it is nearly as simple as possible), `/usr/local/femats/bin/tw`is the path. Not only is this short enough, but it is also location independent, since only the link needs to be changed if the path changes. This is especially convenient for users with magneto-optical (MO) drives, or other types of removable storage.

   While this is of little interest to most users, if odd errors occur about invalid interpreters and that sort of thing, this information may come in handy.

3. **Paths, DISPLAY, etc.**

   A few reminders about the painfully obvious issues:

   1. Make sure the paths are set up properly.
   2. If FEMATS is being run remotely, make sure the DISPLAY environment variable is set properly, and that the X permissions are also turned on (`xhost`).
   3. Beware of shell- and accounting-imposed limits on disk and memory usage.

Appendix A

Files Overview & Directory Listings

A.1 Introduction

As discussed in Chapter 3, the FEMATS installation is organized in a directory tree structure. A full directory listing of the FEMATS source (distribution) tree as it should appear after loading from the distribution tape is given in Section A.2. A full directory listing of the installed tree as it should appear after successful installation is given in Section A.3. Each of the subdirectory names have been chosen to be self-explanatory, and give some indication of their contents.

After `make` has been run successfully, and FEMATS has been completely installed, as mentioned above, the FEMATS directory structure should look like that in Section A.3. In the following abbreviated directory structure the more important files and directories are briefly described with the hope of facilitating continued development by others.

`femats/`	Head of the FEMATS directory tree
`Makefile`	Top-level Makefile for FEMATS
`bench/`	Benchmarking data for various targets
`almond/`	Example run & results for NASA almond
`circ_inlet/`	Benchmark results for circular inlet
`foam_cyl/`	Benchmark results for foam cylinder geometries
`glass_plate/`	Benchmark results for glass plates geometries
`rect_inlet/`	Benchmark results for rectangular inlet
`rect_plate/`	Benchmark results for rectangular plate
`bin/`	Contains all the FEMATS binaries
`doc/`	Documentation directory
`Geomview/`	Documention for 3-D visualization package
`bench/`	Postscript plots for above benchmark cases
`femats/`	FEMATS manuals and information
`prism/`	Manuals for supplied surface meshing packge
`xmgr/`	Manuals for 2-D plotting package
`include/`	Header files for all packages
`lib/`	Library files for all packages
`man/`	Man pages for all packages
`src/`	Source code & binaries for all packages
`Geomview1.5/`	Binaries for 3-D visualization package
`Tix4.0.5/`	Source code for Tcl/Tk widget libraries
`archive/`	Original distributions for all packages

`gui/`	Tcl/Tk source for GUI
`postproc/`	FORTRAN source for data postprocessing
`preproc/`	FORTRAN source for mesh processing, etc.
`prism/`	Source code for surface mesher and its gui
`solver/`	FORTRAN source for the FEMATS solver
`tcl7.5/`	Source code for the Tcl language
`tk4.1/`	Source code for the Tk interface libraries
`xmgr-3.01pl7/`	Source code for the 2-D plotting package

A.2 Source Distribution Directory Listing

```
     total 36
drwxr-xr-x   5 mwnurnbe users       1024 Feb 11 17:55 ./
drwxr-xr-x   4 mwnurnbe users       1024 Mar  4 15:20 ../
-rw-r--r--   1 mwnurnbe users      12400 Dec  2 11:04 Makefile
drwxr-xr-x   8 mwnurnbe users       1024 Oct 28 12:33 bench/
drwxr-xr-x   4 mwnurnbe users       1024 Nov  7 10:49 doc/
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:31 src/

femats/bench:
total 16
drwxr-xr-x   8 mwnurnbe users       1024 Oct 28 12:33 ./
drwxr-xr-x   5 mwnurnbe users       1024 Feb 11 17:55 ../
drwxr-xr-x   3 mwnurnbe users       1024 Mar  4 13:07 almond/
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 circ_inlet/
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 foam_cyl/
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 glass_plate/
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 rect_inlet/
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 rect_plate/

femats/bench/almond:
total 17802
-rw-------   1 mwnurnbe users        325 Mar  4 13:03 !
drwxr-xr-x   3 mwnurnbe users       1024 Mar  4 13:07 ./
drwxr-xr-x   8 mwnurnbe users       1024 Oct 28 12:33 ../
-rw-r--r--   1 mwnurnbe users     186070 Mar  4 13:03 almond.cntr
-rw-r--r--   1 mwnurnbe users      40438 Mar  4 13:03 almond.dat
-rw-r--r--   1 mwnurnbe users     503433 Mar  4 13:03 almond.edgy
-rw-r--r--   1 mwnurnbe users    1444217 Mar  4 13:03 almond.eglob
-rw-r--r--   1 mwnurnbe users     223698 Mar  4 13:03 almond.enoddy
-rw-r--r--   1 mwnurnbe users          0 Mar  4 13:03 almond.error_output
-rw-r--r--   1 mwnurnbe users         44 Mar  4 13:03 almond.esize
-rw-r--r--   1 mwnurnbe users     222800 Mar  4 13:03 almond.esurfed
-rw-r-----   1 mwnurnbe users      77500 Mar  4 13:03 almond.facet
-rw-r--r--   1 mwnurnbe users         40 Mar  4 13:03 almond.fr.dat
-rw-r--r--   1 mwnurnbe users         23 Mar  4 13:03 almond.geom
-rw-r--r--   1 mwnurnbe users         71 Mar  4 13:03 almond.in
-rw-r--r--   1 mwnurnbe users        343 Mar  4 13:03 almond.otpt
-rw-r--r--   1 mwnurnbe users       1671 Mar  4 13:03 almond.preproc.log
-r--r--r--   1 mwnurnbe users       5822 Mar  4 13:03 almond.prj
-rw-r--r--   1 mwnurnbe users       4400 Mar  4 13:03 almond.rcs.mon.t90.0
-rw-r--r--   1 mwnurnbe users       2686 Mar  4 13:03 almond.rcs.mon.t90.TM
-rw-r--r--   1 mwnurnbe users       1930 Mar  4 13:03 almond.rcs.mon.t90.TM.xmgr.par
-rw-r--r--   1 mwnurnbe users      32024 Mar  4 13:03 almond.run.log
-rw-r--r--   1 mwnurnbe users      12622 Mar  4 13:03 almond.tab.mon.t90.0
-rw-r--r--   1 mwnurnbe users    5554113 Mar  4 13:03 almond.unv
-rw-r--r--   1 mwnurnbe users     697383 Mar  4 13:03 almond.viz
-rw-r--r--   1 mwnurnbe users          0 Mar  4 13:07 almond.xmgr.npipe
drwxr-xr-x   2 mwnurnbe users         24 Mar  4 13:06 core/
-rw-r--r--   1 mwnurnbe users        215 Mar  4 13:07 prism.i

femats/bench/almond/core:
total 4
drwxr-xr-x   2 mwnurnbe users         24 Mar  4 13:06 ./
drwxr-xr-x   3 mwnurnbe users       1024 Mar  4 13:07 ../

femats/bench/circ_inlet:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   8 mwnurnbe users       1024 Oct 28 12:33 ../
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 cyl_term/
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 rect_term/

femats/bench/circ_inlet/cyl_term:
total 840
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ../
-rwxr-xr-x   1 mwnurnbe users     409623 May  8  1994 cyl_inlt_c.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        166 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         64 May  8  1994 ip_mesh*

femats/bench/circ_inlet/rect_term:
total 888
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ../
-rwxr-xr-x   1 mwnurnbe users     441796 May  8  1994 cyl_inlet_b.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        242 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         65 May  8  1994 ip_mesh*

femats/bench/foam_cyl:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   8 mwnurnbe users       1024 Oct 28 12:33 ../
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 colinear/
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 echelon/

femats/bench/foam_cyl/colinear:
total 1832
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ../
-rwxr-xr-x   1 mwnurnbe users     920039 May  8  1994 f_cyl_.45.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        160 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         66 May  8  1994 ip_mesh*

femats/bench/foam_cyl/echelon:
total 1832
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ../
-rwxr-xr-x   1 mwnurnbe users     922077 May  8  1994 fom_off.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        163 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         68 May  8  1994 ip_mesh*

femats/bench/glass_plate:
total 728
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   8 mwnurnbe users       1024 Oct 28 12:33 ../
-rwxr-xr-x   1 mwnurnbe users     357570 May  8  1994 gplt_rcs.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        332 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         59 May  8  1994 ip_mesh*

femats/bench/rect_inlet:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   8 mwnurnbe users       1024 Oct 28 12:33 ../
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 rect_term/
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 sphere_term/

femats/bench/rect_inlet/rect_term:
total 744
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ../
-rwxr-xr-x   1 mwnurnbe users        247 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         62 May  8  1994 ip_mesh*
```

```
-rwxr-xr-x   1 mwnurnbe users     363409 May  8  1994 rect.075.unv.Z*

femats/bench/rect_inlet/sphere_term:
total 6
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ../
-rwxr-xr-x   1 mwnurnbe users         98 May  8  1994 ip_femats*

femats/bench/rect_plate:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   8 mwnurnbe users       1024 Oct 28 12:33 ../
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 box_term/
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 mixed_term/

femats/bench/rect_plate/box_term:
total 680
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ../
-rwxr-xr-x   1 mwnurnbe users     334373 Oct  5  1994 c_plt_box.45.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        215 Oct  5  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         67 Oct  5  1994 ip_mesh*

femats/bench/rect_plate/mixed_term:
total 728
drwxr-xr-x   2 mwnurnbe users       1024 Oct 26 16:31 ./
drwxr-xr-x   4 mwnurnbe users       1024 Oct 26 16:31 ../
-rwxr-xr-x   1 mwnurnbe users     359643 Oct  5  1994 cplt_mxd.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        324 Oct  5  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         63 Oct  5  1994 ip_mesh*

femats/doc:
total 12
drwxr-xr-x   4 mwnurnbe users       1024 Nov  7 10:49 ./
drwxr-xr-x   5 mwnurnbe users       1024 Feb 11 17:55 ../
drwxr-xr-x   2 mwnurnbe users       1024 Oct 28 11:54 bench/
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 femats/
-rwxr-xr-x   1 mwnurnbe users       1186 Nov  4 14:06 info.csh*

femats/doc/bench:
total 4708
drwxr-xr-x   2 mwnurnbe users       1024 Oct 28 11:54 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov  7 10:49 ../
-rw-r--r--   1 mwnurnbe users     191099 Oct 26 16:28 circ_inlet_hh_c.ps
-rw-r--r--   1 mwnurnbe users     180165 Oct 26 16:28 circ_inlet_vv_c.ps
-rw-r--r--   1 mwnurnbe users     204989 Oct 26 16:28 foam_cyl_colinear.ps
-rw-r--r--   1 mwnurnbe users     185065 Oct 26 16:28 foam_cyl_echelon.ps
-rw-r--r--   1 mwnurnbe users     217865 Oct 26 16:28 glass_plate.ps
-rw-r--r--   1 mwnurnbe users     157459 Oct 26 16:28 rect_inlet_hh_r.ps
-rw-r--r--   1 mwnurnbe users     157728 Oct 26 16:28 rect_inlet_hh_s.ps
-rw-r--r--   1 mwnurnbe users     157892 Oct 26 16:28 rect_inlet_vv_r.ps
-rw-r--r--   1 mwnurnbe users     161102 Oct 26 16:28 rect_inlet_vv_s.ps
-rw-r--r--   1 mwnurnbe users     222419 Oct 26 16:28 rect_plate_p0_hh.ps
-rw-r--r--   1 mwnurnbe users     218655 Oct 26 16:28 rect_plate_p0_vv.ps
-rw-r--r--   1 mwnurnbe users     197611 Oct 26 16:28 rect_plate_p90_hh.ps

femats/doc/femats:
total 5538
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov  7 10:49 ../
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 15:18 app_a/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 15:19 app_b/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 13:29 app_c/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 13:29 app_d/
drwxr-xr-x   2 mwnurnbe users         24 Mar  4 13:29 app_e/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 13:29 demo_figs/
drwx------   2 mwnurnbe users       1024 Mar  4 13:28 ex_figs/
-rw-------   1 mwnurnbe users    2724545 Mar  4 13:28 gui_final.ps.Z
-rw-r--r--   1 mwnurnbe users      92583 Mar  4 13:26 gui_final.tex

femats/doc/femats/app_a:
total 214
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 15:18 ./
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 ../
-rw-r--r--   1 mwnurnbe users       3695 Mar  4 13:29 f.ps
-rw-r--r--   1 mwnurnbe users       7584 Mar  4 13:29 flow.ps
-rw-r--r--   1 mwnurnbe users       1129 Mar  4 13:29 macros.tex
-rw-r--r--   1 mwnurnbe users      57407 Mar  4 13:29 manual.tex
-rw-r--r--   1 mwnurnbe users      34071 Mar  4 13:29 manual1.tex

femats/doc/femats/app_b:
total 37898
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 15:19 ./
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 ../
-rw-r--r--   1 mwnurnbe users    5602767 Mar  4 13:29 alideas1.ps
-rw-r--r--   1 mwnurnbe users    5602767 Mar  4 13:29 alideas2.ps
-rw-r--r--   1 mwnurnbe users       8220 Mar  4 13:29 almond3L9.ps
-rw-r--r--   1 mwnurnbe users      12144 Mar  4 13:29 almondL9.ps
-rw-r--r--   1 mwnurnbe users      94179 Mar  4 13:29 cinlt1.pos
-rw-r--r--   1 mwnurnbe users    1859016 Mar  4 13:29 cyl.pos
-rw-r--r--   1 mwnurnbe users      96366 Mar  4 13:29 gplt1.pos
-rw-r--r--   1 mwnurnbe users    2109633 Mar  4 13:29 prism_gui.ps
-rw-r--r--   1 mwnurnbe users    1859016 Mar  4 13:29 rect.pos
-rw-r--r--   1 mwnurnbe users      29984 Mar  4 13:29 rep1.tex
-rw-r--r--   1 mwnurnbe users      94746 Mar  4 13:29 rinlt1.pos
-rw-r--r--   1 mwnurnbe users     102036 Mar  4 13:29 rplt1.pos
-rw-r--r--   1 mwnurnbe users    1859016 Mar  4 13:29 sph.pos

femats/doc/femats/app_c:
total 8
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 13:29 ./
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 ../
-rw-r--r--   1 mwnurnbe users       1671 Mar  4 13:29 almond.preproc.log

femats/doc/femats/app_d:
total 68
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 13:29 ./
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 ../
-rw-r--r--   1 mwnurnbe users      32024 Mar  4 13:29 almond.run.log

femats/doc/femats/app_e:
total 4
drwxr-xr-x   2 mwnurnbe users         24 Mar  4 13:29 ./
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 ../
-rw-r--r--   1 mwnurnbe users      21839 Mar  5 10:09 dist_file_list
-rw-r--r--   1 mwnurnbe users     252282 Mar  4 15:25 inst_file_list

femats/doc/femats/demo_figs:
total 40442
drwxr-xr-x   2 mwnurnbe users       1024 Mar  4 13:29 ./
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 ../
-rw-r--r--   1 mwnurnbe users       1297 Mar  4 13:28 coord_sys.fig
```

```
-rw-r--r--   1 mwnurnbe users       5443 Mar  4 13:28 coord_sys.ps
-rw-r--r--   1 mwnurnbe users      31960 Mar  4 13:29 diagram.IslandDraw
-rw-r--r--   1 mwnurnbe users      18914 Mar  4 13:28 diagram.ps
-rw-r--r--   1 mwnurnbe users     284811 Mar  4 13:28 main_geom.ps
-rw-r--r--   1 mwnurnbe users     214258 Mar  4 13:28 main_help.ps
-rw-r--r--   1 mwnurnbe users     191093 Mar  4 13:28 main_menu.ps
-rw-r--r--   1 mwnurnbe users     191095 Mar  4 13:28 main_menu_w.ps
-rw-r--r--   1 mwnurnbe users     247697 Mar  4 13:28 main_post.ps
-rw-r--r--   1 mwnurnbe users     353145 Mar  4 13:28 main_pre.ps
-rw-r--r--   1 mwnurnbe users     404898 Mar  4 13:28 main_pre_mesh.ps
-rw-r--r--   1 mwnurnbe users     377990 Mar  4 13:28 main_proj.ps
-rw-r--r--   1 mwnurnbe users     382308 Mar  4 13:28 main_run.ps
-rw-r--r--   1 mwnurnbe users    1295058 Mar  4 13:28 mat_prop_diel_demo.ps
-rw-r--r--   1 mwnurnbe users    1295068 Mar  4 13:28 mat_prop_rcrd_demo.ps
-rw-r--r--   1 mwnurnbe users    1295068 Mar  4 13:29 mat_prop_zsht_demo.ps
-rw-r--r--   1 mwnurnbe users    3454951 Mar  4 13:29 mesh_post_demo.ps
-rw-r--r--   1 mwnurnbe users     660461 Mar  4 13:29 new_file_req.ps
-rw-r--r--   1 mwnurnbe users    1607930 Mar  4 13:29 prism_demo.ps
-rw-r--r--   1 mwnurnbe users    1695752 Mar  4 13:29 run_local_demo.ps
-rw-r--r--   1 mwnurnbe users    1111295 Mar  4 13:29 runtime_demo.ps
-rw-r--r--   1 mwnurnbe users    1111298 Mar  4 13:29 runtime_demo_bi.ps
-rw-r--r--   1 mwnurnbe users    1111300 Mar  4 13:29 runtime_demo_mono.ps
-rw-r--r--   1 mwnurnbe users     687387 Mar  4 13:29 solver_demo.ps
-rw-r--r--   1 mwnurnbe users    2395917 Mar  4 13:29 xmgr_demo.ps

femats/doc/femats/ex_figs:
total 45220
drwx------   2 mwnurnbe users       1024 Mar  4 13:28 ./
drwxr-xr-x  10 mwnurnbe users       1024 Mar  4 15:18 ../
-rw-r--r--   1 mwnurnbe users    5602767 Mar  4 13:28 alideas2.ps
-rw-r--r--   1 mwnurnbe users     111627 Mar  4 13:28 almond_1.19_10.ps
-rw-------   1 mwnurnbe users     191093 Mar  4 13:28 main_menu_no_proj.ps
-rw-r--r--   1 mwnurnbe users     191110 Mar  4 13:28 main_menu_w_proj.ps
-rw-r--r--   1 mwnurnbe users    1295061 Mar  4 13:28 mat_prop_diel.ps
-rw-r--r--   1 mwnurnbe users    3454954 Mar  4 13:28 mesh_post.ps
-rw-r--r--   1 mwnurnbe users     660469 Mar  4 13:28 new_file_req.ps
-rw-r--r--   1 mwnurnbe users     660470 Mar  4 13:28 open_file_req.ps
-rw-r--r--   1 mwnurnbe users    1607937 Mar  4 13:28 prism_gui.ps
-rw-r--r--   1 mwnurnbe users    1111298 Mar  4 13:28 runtime.ps
-rw-r--r--   1 mwnurnbe users    1695752 Mar  4 13:28 solver.ps
-rw-r--r--   1 mwnurnbe users    1695757 Mar  4 13:28 solver_done.ps
-rw-r--r--   1 mwnurnbe users     687396 Mar  4 13:28 solver_param.ps
-rw-r--r--   1 mwnurnbe users    4012719 Mar  4 13:28 xmgr_almond.ps

femats/src:
total 14
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:31 ./
drwxr-xr-x   5 mwnurnbe users       1024 Feb 11 17:55 ../
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:05 archive/
drwxr-xr-x   2 mwnurnbe users       1024 Dec  9 16:43 gui/
drwxr-xr-x   2 mwnurnbe users       1024 Dec  2 10:46 postproc/
drwxr-xr-x   2 mwnurnbe users       1024 Dec  2 10:40 preproc/
drwxr-xr-x   3 mwnurnbe users       1024 Nov  5 11:33 solver/

femats/src/archive:
total 37958
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:05 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:31 ../
-rw-r--r--   1 mwnurnbe users       6184 Oct 21 11:55 Tix4.0.5.README
-rw-r--r--   1 mwnurnbe users     923293 Oct 21 11:55 Tix4.0.5.tar.Z
-rw-r--r--   1 mwnurnbe users     273360 Oct 21 11:58 TixManPages4.0.5.ps.Z
-rw-r--r--   1 mwnurnbe users      12253 Oct 21 11:58 TixManTitle4.0.5.ps.Z
-rw-r--r--   1 mwnurnbe users       3689 Oct 21 11:48 bbfig.tar.Z
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:37 extras/
-rw-r--r--   1 mwnurnbe users     765669 Oct 21 11:53 geomview-1.5.0-patch1.tar.Z
-rw-r--r--   1 mwnurnbe users    3940599 Oct 21 11:50 geomview-hp.tar.Z
-rw-r--r--   1 mwnurnbe users    8112669 Oct 21 11:51 geomview-opengl-irix5.tar.Z
-rw-r--r--   1 mwnurnbe users      82597 Nov  6 14:58 prism.tar.Z
-rw-r--r--   1 mwnurnbe users    1347288 Oct 21 11:56 tcl7.5.tar.Z
-rw-r--r--   1 mwnurnbe users    2547487 Oct 21 11:56 tk4.1.tar.Z
-rw-r--r--   1 mwnurnbe users    1316040 Oct 21 11:48 xmgr-3.01pl7.tar.Z

femats/src/archive/extras:
total 36
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:37 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:05 ../
-rwxr-xr-x   1 mwnurnbe users        585 Oct 26 14:27 build_Geomview1.5*
-rwxr-xr-x   1 mwnurnbe users        516 Nov  4 15:14 fix_gui_interp*
-rwxr-xr-x   1 mwnurnbe users        301 Nov  4 10:04 fix_man_pages*
-rw-r--r--   1 mwnurnbe users      12694 Nov 27 09:35 xmgr-3.01pl7_Makefile

femats/src/gui:
total 300
drwxr-xr-x   2 mwnurnbe users       1024 Dec  9 16:43 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:31 ../
-rw-r--r--   1 mwnurnbe users        212 Oct 28 10:05 default.prism.i
-rw-r--r--   1 mwnurnbe users       5539 Oct 30 13:23 default.prj
-rw-r--r--   1 mwnurnbe users       2088 Nov  4 15:12 init.orig
-rwxr-xr-x   1 mwnurnbe users       2108 Nov  5 14:14 init.tcl*
-rwxr-xr-x   1 mwnurnbe users       7280 Dec  9 12:00 main_menu.tcl*
-rwxr-xr-x   1 mwnurnbe users        571 Nov  2 14:03 meshing.tcl*
-rwxr-xr-x   1 mwnurnbe users        489 Nov  4 15:27 meshing_prism.csh*
-rwxr-xr-x   1 mwnurnbe users      10528 Nov  7 11:36 postproc.tcl*
-rwxr-xr-x   1 mwnurnbe users      53590 Nov  4 18:46 preproc.tcl*
-rwxr-xr-x   1 mwnurnbe users       1734 Nov  7 10:00 preproc_pppipe.tcl*
-rwxr-xr-x   1 mwnurnbe users       6279 Nov  4 18:46 preproc_ppscript.csh*
-rwxr-xr-x   1 mwnurnbe users      11288 Oct 31 14:00 project.tcl*
-rwxr-xr-x   1 mwnurnbe users      27435 Nov 27 09:43 run.tcl*
-rwxr-xr-x   1 mwnurnbe users       3501 Nov  7 10:00 run_solverpipe.tcl*
-rw-r--r--   1 mwnurnbe users       5688 Nov  5 11:42 tclIndex
-rwxr-xr-x   1 mwnurnbe users       2108 Nov  1 10:38 test.tcl*

femats/src/postproc:
total 18
drwxr-xr-x   2 mwnurnbe users       1024 Dec  2 10:46 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:31 ../
-rw-r--r--   1 mwnurnbe users        546 Nov  2 15:15 Makefile
-rwxr--r--   1 mwnurnbe users        480 Nov  2 15:19 fem_data.h*
-rw-r--r--   1 mwnurnbe users       4155 Oct 25 17:31 post.f

femats/src/preproc:
total 152
drwxr-xr-x   2 mwnurnbe users       1024 Dec  2 10:40 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:31 ../
-rw-r--r--   1 mwnurnbe users        492 Nov  2 15:12 Makefile
-rw-r--r--   1 mwnurnbe users      20641 Nov 23 16:19 c2p.f
-rw-r--r--   1 mwnurnbe users      23847 Oct 25 17:14 c2p_2d.f
-rw-r--r--   1 mwnurnbe users       3735 Nov 27 10:15 count.f
-rw-r--r--   1 mwnurnbe users        413 Oct 25 17:18 parmvl
-rw-r--r--   1 mwnurnbe users       9105 Oct 25 17:14 prompt.f
-rw-r--r--   1 mwnurnbe users      14303 Oct 25 17:14 u2c.f
```

```
femats/src/solver:
total 6
drwxr-xr-x   3 mwnurnbe users       1024 Nov  5 11:33 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:31 ../
drwxr-xr-x   4 mwnurnbe users       1024 Nov 25 08:46 hp/

femats/src/solver/hp:
total 332
drwxr-xr-x   4 mwnurnbe users       1024 Nov 25 08:46 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov  5 11:33 ../
-rw-r--r--   1 mwnurnbe users       2351 Nov  2 15:17 Makefile
-rw-r--r--   1 mwnurnbe users       1270 Oct  5  1994 README
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 asc2bin/
-rw-r-----   1 mwnurnbe users       6560 Oct 25 17:21 bicg.F
-rwxr--r--   1 mwnurnbe users       2183 Oct 25 17:21 diag.F*
-rwxr-xr-x   1 mwnurnbe users     102400 Nov  5 14:15 fem*
-rw-r--r--   1 mwnurnbe users      16685 Nov  5 11:28 fem.F
-rwxr--r--   1 mwnurnbe users        480 Oct 26 12:51 fem_data.h*
-rwxr--r--   1 mwnurnbe users       1981 Oct 25 17:21 jaggd.F*
-rwxr--r--   1 mwnurnbe users       6719 Oct 25 17:21 k2.F*
-rw-r-----   1 mwnurnbe users        772 Oct 25 17:21 mult.F
-rw-r--r--   1 mwnurnbe users        437 Oct 25 17:21 second.F
drwxr-xr-x   2 mwnurnbe users       1024 Nov 25 08:46 sub/
-rw-r--r--   1 mwnurnbe users         71 Jul 29  1996 unbuff.c
-rw-r--r--   1 mwnurnbe users       4414 Oct 25 17:21 xc.F

femats/src/solver/hp/asc2bin:
total 14
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 25 08:46 ../
-rwxr--r--   1 mwnurnbe users        480 Oct 26 12:53 fem_data.h*
-rwxr--r--   1 mwnurnbe users       3249 Oct 25 17:23 fr.F*

femats/src/solver/hp/sub:
total 154
drwxr-xr-x   2 mwnurnbe users       1024 Nov 25 08:46 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 25 08:46 ../
-rwxr--r--   1 mwnurnbe users       1961 Oct 25 17:24 basis1.f*
-rwxr--r--   1 mwnurnbe users      10850 Oct 25 17:24 bd1.f*
-rwxr--r--   1 mwnurnbe users       6778 Oct 25 17:24 bi2mono.f*
-rwxr--r--   1 mwnurnbe users        820 Oct 25 17:24 calc1.f*
-rwxr--r--   1 mwnurnbe users       1507 Oct 25 17:24 comput.f*
-rwxr--r--   1 mwnurnbe users        928 Oct 25 17:24 crux.f*
-rw-r--r--   1 mwnurnbe users       1733 Oct 25 17:24 cruxd1.f
-rwxr--r--   1 mwnurnbe users        908 Oct 25 17:24 f11.f*
-rwxr--r--   1 mwnurnbe users      13565 Oct 25 17:24 fcmb.f*
-rwxr--r--   1 mwnurnbe users        480 Oct 26 12:51 fem_data.h*
-rwxr--r--   1 mwnurnbe users       2600 Oct 25 17:24 finc.f*
-rwxr--r--   1 mwnurnbe users        801 Oct 25 17:24 heapsort.f*
-rwxr--r--   1 mwnurnbe users       2226 Oct 25 17:24 incc1.f*
-rwxr--r--   1 mwnurnbe users       2105 Oct 25 17:24 incd1.f*
-rwxr--r--   1 mwnurnbe users       2247 Oct 25 17:24 inci.f*
-rwxr--r--   1 mwnurnbe users       2311 Oct 25 17:24 incr.f*
-rwxr--r--   1 mwnurnbe users       1542 Oct 25 17:24 norm2d.f*
-rwxr--r--   1 mwnurnbe users       2458 Oct 25 17:24 norma.f*
-rwxr--r--   1 mwnurnbe users       1359 Oct 25 17:24 ops.f*
-rwxr--r--   1 mwnurnbe users        560 Oct 25 17:24 ord.f*
-rwxr--r--   1 mwnurnbe users        625 Oct 25 17:24 sort.f*
-rwxr--r--   1 mwnurnbe users        488 Oct 25 17:24 string.f*
-rwxr--r--   1 mwnurnbe users       1556 Oct 25 17:24 surfint1.f*
-rwxr--r--   1 mwnurnbe users       3363 Oct 25 17:24 value.f*
-rwxr--r--   1 mwnurnbe users        439 Oct 25 17:24 volume.f*
```

A.3 Installed Directory Tree Listing

```
      total 66
drwxr-xr-x   9 mwnurnbe users       1024 Mar  4 14:43 ./
drwxr-xr-x   5 mwnurnbe users       1024 Mar  4 15:24 ../
-rw-r--r--   1 mwnurnbe users      12266 Mar  4 14:43 Makefile
-rw-r--r--   1 mwnurnbe users      12266 Mar  4 14:43 Makefile.bak
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 09:42 bench/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:06 bin/
drwxr-xr-x   4 mwnurnbe users       1024 Feb 24 17:35 doc/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:58 include/
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 10:03 lib/
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:03 man/
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 src/

femats/bench:
total 16
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  4 14:43 ../
drwxr-xr-x   2 mwnurnbe users         24 Nov 27 09:42 almond/
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 circ_inlet/
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 foam_cyl/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 glass_plate/
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 rect_inlet/
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 rect_plate/

femats/bench/almond:
total 4
drwxr-xr-x   2 mwnurnbe users         24 Nov 27 09:42 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 09:42 ../

femats/bench/circ_inlet:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 09:42 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 cyl_term/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 rect_term/

femats/bench/circ_inlet/cyl_term:
total 840
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users     409623 May  8  1994 cyl_inlt_c.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        166 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         64 May  8  1994 ip_mesh*

femats/bench/circ_inlet/rect_term:
total 888
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users     441796 May  8  1994 cyl_inlet_b.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        242 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         65 May  8  1994 ip_mesh*

femats/bench/foam_cyl:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 09:42 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 colinear/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 echelon/

femats/bench/foam_cyl/colinear:
total 1832
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users     920039 May  8  1994 f_cyl_.45.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        160 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         66 May  8  1994 ip_mesh*

femats/bench/foam_cyl/echelon:
total 1832
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users     922077 May  8  1994 fom_off.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        163 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         68 May  8  1994 ip_mesh*

femats/bench/glass_plate:
total 728
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users     357570 May  8  1994 gplt_rcs.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        332 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         59 May  8  1994 ip_mesh*

femats/bench/rect_inlet:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 09:42 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 rect_term/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 sphere_term/

femats/bench/rect_inlet/rect_term:
total 744
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users        247 May  8  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         62 May  8  1994 ip_mesh*
-rwxr-xr-x   1 mwnurnbe users     363409 May  8  1994 rect.075.unv.Z*

femats/bench/rect_inlet/sphere_term:
total 6
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users         98 May  8  1994 ip_femats*

femats/bench/rect_plate:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 09:42 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 box_term/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 mixed_term/

femats/bench/rect_plate/box_term:
total 680
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users     334373 Oct  5  1994 c_plt_box.45.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        215 Oct  5  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         67 Oct  5  1994 ip_mesh*

femats/bench/rect_plate/mixed_term:
total 728
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
```

```
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:42 ../
-rwxr-xr-x   1 mwnurnbe users     359643 Oct  5  1994 cplt_mxd.unv.Z*
-rwxr-xr-x   1 mwnurnbe users        324 Oct  5  1994 ip_femats*
-rwxr-xr-x   1 mwnurnbe users         63 Oct  5  1994 ip_mesh*

femats/bin:
total 13292
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:06 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  4 14:43 ../
-rwxr-xr-x   1 mwnurnbe users      20480 Nov 27 10:04 ac2pr*
-rwxr-xr-x   1 mwnurnbe users     282624 Nov 27 10:02 anytooff*
-rwxr-xr-x   1 mwnurnbe users     290816 Nov 27 10:02 anytoucd*
-rwxr-xr-x   1 mwnurnbe users     286720 Nov 27 10:02 bdy*
-rwxr-xr-x   1 mwnurnbe users      45056 Nov 27 10:16 c2p*
-rwxr-xr-x   1 mwnurnbe users      49152 Nov 27 10:16 c2p_2d*
-rwxr-xr-x   1 mwnurnbe users     290816 Nov 27 10:02 clip*
-rwxr-xr-x   1 mwnurnbe users      24576 Nov 27 10:16 count*
-rwxr-xr-x   1 mwnurnbe users     102400 Nov 27 10:06 fem*
lrwxr-xr-x   1 mwnurnbe users         19 Nov 27 10:04 femats@ -> ../src/gui/init.tcl
-rwxr-xr-x   1 mwnurnbe users      28672 Nov 27 10:06 fr*
-rwxr-xr-x   1 mwnurnbe users        734 Nov 27 10:02 geomstuff*
-rwxr-xr-x   1 mwnurnbe users       2647 Nov 27 10:03 geomview*
-rwxr-xr-x   1 mwnurnbe users      24576 Nov 27 10:02 math2oogl*
-rwxr-xr-x   1 mwnurnbe users       1024 Nov 27 10:02 medit2gv*
-rwxr-xr-x   1 mwnurnbe users     278528 Nov 27 10:02 offconsol*
-rwxr-xr-x   1 mwnurnbe users     356352 Nov 27 10:02 oogl2rib*
-rwxr-xr-x   1 mwnurnbe users      36864 Nov 27 10:02 polymerge*
-rwxr-xr-x   1 mwnurnbe users      32768 Nov 27 10:06 post*
-rwxr-xr-x   1 mwnurnbe users      98304 Nov 27 10:04 prism*
-rwxr-xr-x   1 mwnurnbe users      10854 Nov 27 10:04 prism_gui*
-rwxr-xr-x   1 mwnurnbe users      40960 Nov 27 10:16 prompt*
lrwxr-xr-x   1 mwnurnbe users          8 Nov 27 09:47 tclsh@ -> tclsh7.5
-rwxr-xr-x   1 mwnurnbe users     425984 Nov 27 09:46 tclsh7.5*
-rwxr-xr-x   1 mwnurnbe users       2009 Nov 27 09:59 tixindex*
lrwxr-xr-x   1 mwnurnbe users         13 Nov 27 09:59 tixwish@ -> tixwish-tk4.1
-rwxr-xr-x   1 mwnurnbe users    1208320 Nov 27 09:59 tixwish-tk4.1*
-rwxr-xr-x   1 mwnurnbe users      16384 Nov 27 10:02 togeomview*
lrwxr-xr-x   1 mwnurnbe users          7 Nov 27 10:04 tw@ -> tixwish
-rwxr-xr-x   1 mwnurnbe users      45056 Nov 27 10:16 u2c*
-rwxr-xr-x   1 mwnurnbe users     274432 Nov 27 10:02 ucdtooff*
lrwxr-xr-x   1 mwnurnbe users          7 Nov 27 09:55 wish@ -> wish4.1
-rwxr-xr-x   1 mwnurnbe users    1073152 Nov 27 09:54 wish4.1*
lrwxr-xr-x   1 mwnurnbe users         11 Nov 27 10:02 xmgr@ -> xmgr3.01pl7
-rwxr-xr-x   1 mwnurnbe users    1314816 Nov 27 10:02 xmgr3.01pl7*

femats/doc:
total 12
drwxr-xr-x   4 mwnurnbe users       1024 Feb 24 17:35 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  4 14:43 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 bench/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  2 15:50 femats/
-rwxr-xr-x   1 mwnurnbe users       1186 Nov  4 14:06 info.csh*

femats/doc/bench:
total 4708
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x   4 mwnurnbe users       1024 Feb 24 17:35 ../
-rw-r--r--   1 mwnurnbe users     191099 Oct 26 16:28 circ_inlet_hh_c.ps
-rw-r--r--   1 mwnurnbe users     180165 Oct 26 16:28 circ_inlet_vv_c.ps
-rw-r--r--   1 mwnurnbe users     204989 Oct 26 16:28 foam_cyl_colinear.ps
-rw-r--r--   1 mwnurnbe users     185065 Oct 26 16:28 foam_cyl_echelon.ps
-rw-r--r--   1 mwnurnbe users     217865 Oct 26 16:28 glass_plate.ps
-rw-r--r--   1 mwnurnbe users     157459 Oct 26 16:28 rect_inlet_hh_r.ps
-rw-r--r--   1 mwnurnbe users     157728 Oct 26 16:28 rect_inlet_hh_s.ps
-rw-r--r--   1 mwnurnbe users     157892 Oct 26 16:28 rect_inlet_vv_r.ps
-rw-r--r--   1 mwnurnbe users     161102 Oct 26 16:28 rect_inlet_vv_s.ps
-rw-r--r--   1 mwnurnbe users     222419 Oct 26 16:28 rect_plate_p0_hh.ps
-rw-r--r--   1 mwnurnbe users     218655 Oct 26 16:28 rect_plate_p0_vv.ps
-rw-r--r--   1 mwnurnbe users     197611 Oct 26 16:28 rect_plate_p90_hh.ps

femats/doc/femats:
total 7464
drwxr-xr-x   9 mwnurnbe users       1024 Mar  5 10:17 ./
drwxr-xr-x   7 mwnurnbe users       1024 Mar  5 10:19 ../
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:15 app_a/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 app_b/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 app_c/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 app_d/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 app_e/
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 demo_figs/
drwx------   2 mwnurnbe users       1024 Mar  5 10:17 ex_figs/
-rw-r--r--   1 mwnurnbe users    2839313 Mar  5 10:17 gui_final.ps.Z
-rw-r--r--   1 mwnurnbe users      92583 Mar  5 10:17 gui_final.tex

femats/doc/femats/app_a:
total 214
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:15 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  5 10:17 ../
-rw-r--r--   1 mwnurnbe users       3695 Mar  5 10:15 f.ps
-rw-r--r--   1 mwnurnbe users       7584 Mar  5 10:15 flow.ps
-rw-r--r--   1 mwnurnbe users       1129 Mar  5 10:15 macros.tex
-rw-r--r--   1 mwnurnbe users      57407 Mar  5 10:15 manual.tex
-rw-r--r--   1 mwnurnbe users      34071 Mar  5 10:15 manual1.tex

femats/doc/femats/app_b:
total 37898
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  5 10:17 ../
-rw-r--r--   1 mwnurnbe users    5602767 Mar  5 10:15 alideas1.ps
-rw-r--r--   1 mwnurnbe users    5602767 Mar  5 10:15 alideas2.ps
-rw-r--r--   1 mwnurnbe users       8220 Mar  5 10:15 almond3L9.ps
-rw-r--r--   1 mwnurnbe users      12144 Mar  5 10:15 almondL9.ps
-rw-r--r--   1 mwnurnbe users      94179 Mar  5 10:15 cinltl.pos
-rw-r--r--   1 mwnurnbe users    1859016 Mar  5 10:16 cyl.pos
-rw-r--r--   1 mwnurnbe users      96366 Mar  5 10:16 gpltl.pos
-rw-r--r--   1 mwnurnbe users    2109633 Mar  5 10:16 prism_gui.ps
-rw-r--r--   1 mwnurnbe users    1859016 Mar  5 10:16 rect.pos
-rw-r--r--   1 mwnurnbe users      29984 Mar  5 10:16 repl.tex
-rw-r--r--   1 mwnurnbe users      94746 Mar  5 10:16 rinltl.pos
-rw-r--r--   1 mwnurnbe users     102036 Mar  5 10:16 rpltl.pos
-rw-r--r--   1 mwnurnbe users    1859016 Mar  5 10:16 sph.pos

femats/doc/femats/app_c:
total 8
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  5 10:17 ../
-rw-r--r--   1 mwnurnbe users       1671 Mar  5 10:16 almond.preproc.log

femats/doc/femats/app_d:
total 68
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  5 10:17 ../
```

```
-rw-r--r--   1 mwnurnbe users      32024 Mar  5 10:16 almond.run.log

femats/doc/femats/app_e:
total 564
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  5 10:17 ../
-rw-r--r--   1 mwnurnbe users      21839 Mar  5 10:16 dist_file_list
-rw-r--r--   1 mwnurnbe users     252282 Mar  5 10:16 inst_file_list

femats/doc/femats/demo_figs:
total 40442
drwxr-xr-x   2 mwnurnbe users       1024 Mar  5 10:16 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  5 10:17 ../
-rw-r--r--   1 mwnurnbe users       1297 Mar  5 10:16 coord_sys.fig
-rw-r--r--   1 mwnurnbe users       5443 Mar  5 10:16 coord_sys.ps
-rw-r--r--   1 mwnurnbe users      31960 Mar  5 10:16 diagram.IslandDraw
-rw-r--r--   1 mwnurnbe users      18914 Mar  5 10:16 diagram.ps
-rw-r--r--   1 mwnurnbe users     284811 Mar  5 10:16 main_geom.ps
-rw-r--r--   1 mwnurnbe users     214258 Mar  5 10:16 main_help.ps
-rw-r--r--   1 mwnurnbe users     191093 Mar  5 10:16 main_menu.ps
-rw-r--r--   1 mwnurnbe users     191095 Mar  5 10:16 main_menu_w.ps
-rw-r--r--   1 mwnurnbe users     247697 Mar  5 10:16 main_post.ps
-rw-r--r--   1 mwnurnbe users     353145 Mar  5 10:16 main_pre.ps
-rw-r--r--   1 mwnurnbe users     404898 Mar  5 10:16 main_pre_mesh.ps
-rw-r--r--   1 mwnurnbe users     377990 Mar  5 10:16 main_proj.ps
-rw-r--r--   1 mwnurnbe users     382308 Mar  5 10:16 main_run.ps
-rw-r--r--   1 mwnurnbe users    1295058 Mar  5 10:16 mat_prop_diel_demo.ps
-rw-r--r--   1 mwnurnbe users    1295068 Mar  5 10:16 mat_prop_rcrd_demo.ps
-rw-r--r--   1 mwnurnbe users    1295068 Mar  5 10:16 mat_prop_zsht_demo.ps
-rw-r--r--   1 mwnurnbe users    3454951 Mar  5 10:16 mesh_post_demo.ps
-rw-r--r--   1 mwnurnbe users     660461 Mar  5 10:16 new_file_req.ps
-rw-r--r--   1 mwnurnbe users    1607930 Mar  5 10:16 prism_demo.ps
-rw-r--r--   1 mwnurnbe users    1695752 Mar  5 10:16 run_local_demo.ps
-rw-r--r--   1 mwnurnbe users    1111295 Mar  5 10:16 runtime_demo.ps
-rw-r--r--   1 mwnurnbe users    1111298 Mar  5 10:16 runtime_demo_bi.ps
-rw-r--r--   1 mwnurnbe users    1111300 Mar  5 10:16 runtime_demo_mono.ps
-rw-r--r--   1 mwnurnbe users     687387 Mar  5 10:16 solver_demo.ps
-rw-r--r--   1 mwnurnbe users    2395917 Mar  5 10:16 xmgr_demo.ps

femats/doc/femats/ex_figs:
total 45220
drwx------   2 mwnurnbe users       1024 Mar  5 10:17 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  5 10:17 ../
-rw-r--r--   1 mwnurnbe users    5602767 Mar  5 10:17 alideas2.ps
-rw-r--r--   1 mwnurnbe users     111627 Mar  5 10:17 almond_1.19_10.ps
-rw-------   1 mwnurnbe users     191093 Mar  5 10:16 main_menu_no_proj.ps
-rw-r--r--   1 mwnurnbe users     191110 Mar  5 10:16 main_menu_w_proj.ps
-rw-r--r--   1 mwnurnbe users    1295061 Mar  5 10:16 mat_prop_diel.ps
-rw-r--r--   1 mwnurnbe users    3454954 Mar  5 10:16 mesh_post.ps
-rw-r--r--   1 mwnurnbe users     660469 Mar  5 10:16 new_file_req.ps
-rw-r--r--   1 mwnurnbe users     660470 Mar  5 10:16 open_file_req.ps
-rw-r--r--   1 mwnurnbe users    1607937 Mar  5 10:16 prism_gui.ps
-rw-r--r--   1 mwnurnbe users    1111298 Mar  5 10:16 runtime.ps
-rw-r--r--   1 mwnurnbe users    1695752 Mar  5 10:16 solver.ps
-rw-r--r--   1 mwnurnbe users    1695757 Mar  5 10:17 solver_done.ps
-rw-r--r--   1 mwnurnbe users     687396 Mar  5 10:16 solver_param.ps
-rw-r--r--   1 mwnurnbe users    4012719 Mar  5 10:17 xmgr_almond.ps

femats/include:
total 218
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:58 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  4 14:43 ../
-rw-r--r--   1 mwnurnbe users      39934 Nov 27 09:46 tcl.h
-rw-r--r--   1 mwnurnbe users      15382 Nov 27 09:58 tix.h
-rw-r--r--   1 mwnurnbe users      52444 Nov 27 09:54 tk.h

femats/lib:
total 3102
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  4 14:43 ../
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 app-defaults/
-r-xr-xr-x   1 mwnurnbe users     418788 Nov 27 09:46 libtcl7.5.a*
-rw-r--r--   1 mwnurnbe users     290916 Nov 27 09:59 libtix-tk4.1.a
-r-xr-xr-x   1 mwnurnbe users     825792 Nov 27 09:54 libtk4.1.a*
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:03 maple/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 math/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:46 tcl7.5/
-rw-r--r--   1 mwnurnbe users       3670 Nov 27 09:46 tclConfig.sh
drwxr-xr-x   5 mwnurnbe users       2048 Nov 27 09:58 tix/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:54 tk4.1/
-rw-r--r--   1 mwnurnbe users       1737 Nov 27 09:54 tkConfig.sh

femats/lib/app-defaults:
total 6
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 10:03 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 XMgr/

femats/lib/app-defaults/XMgr:
total 8
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users       1287 Nov 27 10:02 XMgr.ad

femats/lib/maple:
total 32
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users      12536 Nov 27 10:03 gvplot.m
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 src/

femats/lib/maple/src:
total 52
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users      23798 Nov 27 10:03 gvplot

femats/lib/math:
total 34
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users       2682 Nov 27 10:03 BezierPlot.m
-rw-r--r--   1 mwnurnbe users        706 Nov 27 10:03 Geomview.m
-rw-r--r--   1 mwnurnbe users      11221 Nov 27 10:03 OOGL.m

femats/lib/tcl7.5:
total 64
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:46 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users      15724 Nov 27 09:46 init.tcl
-rw-r--r--   1 mwnurnbe users       6251 Nov 27 09:46 ldAout.tcl
-rw-r--r--   1 mwnurnbe users        858 Nov 27 09:46 parray.tcl
```

```
-rw-r--r--   1 mwnurnbe users       3105 Nov 27 09:46 tclAppInit.c
-rw-r--r--   1 mwnurnbe users       1093 Nov 27 09:46 tclIndex

femats/lib/tix:
total 736
drwxr-xr-x   5 mwnurnbe users       2048 Nov 27 09:58 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users      11497 Nov 27 09:58 Balloon.tcl
-rw-r--r--   1 mwnurnbe users       2507 Nov 27 09:58 BtnBox.tcl
-rw-r--r--   1 mwnurnbe users      33648 Nov 27 09:58 ComboBox.tcl
-rw-r--r--   1 mwnurnbe users        827 Nov 27 09:58 Compat.tcl
-rw-r--r--   1 mwnurnbe users      11541 Nov 27 09:58 Control.tcl
-rw-r--r--   1 mwnurnbe users       2638 Nov 27 09:58 DefSchm.tcl
-rw-r--r--   1 mwnurnbe users       4099 Nov 27 09:58 DialogS.tcl
-rw-r--r--   1 mwnurnbe users       7053 Nov 27 09:58 DirList.tcl
-rw-r--r--   1 mwnurnbe users       9273 Nov 27 09:58 DirTree.tcl
-rw-r--r--   1 mwnurnbe users       3830 Nov 27 09:58 DragDrop.tcl
-rw-r--r--   1 mwnurnbe users      11198 Nov 27 09:58 EFileBox.tcl
-rw-r--r--   1 mwnurnbe users       1406 Nov 27 09:58 EFileDlg.tcl
-rw-r--r--   1 mwnurnbe users       4541 Nov 27 09:58 Event.tcl
-rw-r--r--   1 mwnurnbe users      14171 Nov 27 09:58 FileBox.tcl
-rw-r--r--   1 mwnurnbe users        886 Nov 27 09:58 FileCmpt.tcl
-rw-r--r--   1 mwnurnbe users       2009 Nov 27 09:58 FileDlg.tcl
-rw-r--r--   1 mwnurnbe users       6030 Nov 27 09:58 FileEnt.tcl
-rw-r--r--   1 mwnurnbe users       1507 Nov 27 09:58 FileUtil.tcl
-rw-r--r--   1 mwnurnbe users      16093 Nov 27 09:58 HList.tcl
-rw-r--r--   1 mwnurnbe users       4340 Nov 27 09:58 HListDD.tcl
-rw-r--r--   1 mwnurnbe users       1648 Nov 27 09:58 Init.tcl
-rw-r--r--   1 mwnurnbe users       1798 Nov 27 09:58 LabEntry.tcl
-rw-r--r--   1 mwnurnbe users       1072 Nov 27 09:58 LabFrame.tcl
-rw-r--r--   1 mwnurnbe users       3787 Nov 27 09:58 LabWidg.tcl
-rw-r--r--   1 mwnurnbe users       2144 Nov 27 09:58 ListNBk.tcl
-rw-r--r--   1 mwnurnbe users       5940 Nov 27 09:58 NoteBook.tcl
-rw-r--r--   1 mwnurnbe users       5507 Nov 27 09:58 OldUtil.tcl
-rw-r--r--   1 mwnurnbe users       9232 Nov 27 09:58 OptMenu.tcl
-rw-r--r--   1 mwnurnbe users      26939 Nov 27 09:58 PanedWin.tcl
-rw-r--r--   1 mwnurnbe users       4585 Nov 27 09:58 PopMenu.tcl
-rw-r--r--   1 mwnurnbe users      10440 Nov 27 09:58 Primitiv.tcl
-rw-r--r--   1 mwnurnbe users      12742 Nov 27 09:58 ResizeH.tcl
-rw-r--r--   1 mwnurnbe users       3208 Nov 27 09:58 SHList.tcl
-rw-r--r--   1 mwnurnbe users       7049 Nov 27 09:58 SListBox.tcl
-rw-r--r--   1 mwnurnbe users       3105 Nov 27 09:58 SText.tcl
-rw-r--r--   1 mwnurnbe users       9928 Nov 27 09:58 SWidget.tcl
-rw-r--r--   1 mwnurnbe users       6806 Nov 27 09:58 SWindow.tcl
-rw-r--r--   1 mwnurnbe users       7022 Nov 27 09:58 Select.tcl
-rw-r--r--   1 mwnurnbe users        888 Nov 27 09:58 Shell.tcl
-rw-r--r--   1 mwnurnbe users        944 Nov 27 09:58 SimpDlg.tcl
-rw-r--r--   1 mwnurnbe users       1776 Nov 27 09:58 StackWin.tcl
-rw-r--r--   1 mwnurnbe users       1165 Nov 27 09:58 StatBar.tcl
-rw-r--r--   1 mwnurnbe users       1483 Nov 27 09:58 StdBBox.tcl
-rw-r--r--   1 mwnurnbe users        999 Nov 27 09:58 StdShell.tcl
-rw-r--r--   1 mwnurnbe users      11259 Nov 27 09:58 Tix.tcl
-rw-r--r--   1 mwnurnbe users       4165 Nov 27 09:58 Tree.tcl
-rw-r--r--   1 mwnurnbe users       3822 Nov 27 09:58 UnixFile.tcl
-rw-r--r--   1 mwnurnbe users      11035 Nov 27 09:58 Utils.tcl
-rw-r--r--   1 mwnurnbe users       4841 Nov 27 09:58 VResize.tcl
-rw-r--r--   1 mwnurnbe users       8848 Nov 27 09:58 VStack.tcl
-rw-r--r--   1 mwnurnbe users       4473 Nov 27 09:58 VTree.tcl
-rw-r--r--   1 mwnurnbe users       2383 Nov 27 09:58 Variable.tcl
-rw-r--r--   1 mwnurnbe users        312 Nov 27 09:58 Verify.tcl
-rw-r--r--   1 mwnurnbe users        375 Nov 27 09:58 Version.tcl
-rw-r--r--   1 mwnurnbe users        792 Nov 27 09:58 WInfo.tcl
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:58 bitmaps/
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:58 demos/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:58 pref/
-rw-r--r--   1 mwnurnbe users      11271 Nov 27 09:58 tclIndex

femats/lib/tix/bitmaps:
total 132
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:58 ./
drwxr-xr-x   5 mwnurnbe users       2048 Nov 27 09:58 ../
-rw-r--r--   1 mwnurnbe users         90 Nov 27 09:58 act_fold.gif
-rw-r--r--   1 mwnurnbe users        221 Nov 27 09:58 act_fold.xbm
-rw-r--r--   1 mwnurnbe users        436 Nov 27 09:58 act_fold.xpm
-rw-r--r--   1 mwnurnbe users        123 Nov 27 09:58 balarrow.xbm
-rw-r--r--   1 mwnurnbe users        263 Nov 27 09:58 cbxarrow.xbm
-rw-r--r--   1 mwnurnbe users        254 Nov 27 09:58 ck_def.xbm
-rw-r--r--   1 mwnurnbe users        254 Nov 27 09:58 ck_off.xbm
-rw-r--r--   1 mwnurnbe users        251 Nov 27 09:58 ck_on.xbm
-rw-r--r--   1 mwnurnbe users        254 Nov 27 09:58 cross.xbm
-rw-r--r--   1 mwnurnbe users         99 Nov 27 09:58 decr.xbm
-rw-r--r--   1 mwnurnbe users        326 Nov 27 09:58 drop.xbm
-rw-r--r--   1 mwnurnbe users         76 Nov 27 09:58 file.gif
-rw-r--r--   1 mwnurnbe users        233 Nov 27 09:58 file.xbm
-rw-r--r--   1 mwnurnbe users        298 Nov 27 09:58 file.xpm
-rw-r--r--   1 mwnurnbe users         79 Nov 27 09:58 folder.gif
-rw-r--r--   1 mwnurnbe users        215 Nov 27 09:58 folder.xbm
-rw-r--r--   1 mwnurnbe users        418 Nov 27 09:58 folder.xpm
-rw-r--r--   1 mwnurnbe users        896 Nov 27 09:58 harddisk.xbm
-rw-r--r--   1 mwnurnbe users        969 Nov 27 09:58 hourglas.mask
-rw-r--r--   1 mwnurnbe users        940 Nov 27 09:58 hourglas.xbm
-rw-r--r--   1 mwnurnbe users         99 Nov 27 09:58 incr.xbm
-rw-r--r--   1 mwnurnbe users        159 Nov 27 09:58 info.gif
-rw-r--r--   1 mwnurnbe users       1258 Nov 27 09:58 info.xpm
-rw-r--r--   1 mwnurnbe users        284 Nov 27 09:58 maximize.xbm
-rw-r--r--   1 mwnurnbe users        284 Nov 27 09:58 minimize.xbm
-rw-r--r--   1 mwnurnbe users         57 Nov 27 09:58 minus.gif
-rw-r--r--   1 mwnurnbe users        198 Nov 27 09:58 minus.xbm
-rw-r--r--   1 mwnurnbe users        201 Nov 27 09:58 minus.xpm
-rw-r--r--   1 mwnurnbe users         59 Nov 27 09:58 minusarm.gif
-rw-r--r--   1 mwnurnbe users        207 Nov 27 09:58 minusarm.xbm
-rw-r--r--   1 mwnurnbe users        220 Nov 27 09:58 minusarm.xpm
-rw-r--r--   1 mwnurnbe users        176 Nov 27 09:58 mktransgif.tcl
-rw-r--r--   1 mwnurnbe users        893 Nov 27 09:58 network.xbm
-rw-r--r--   1 mwnurnbe users        176 Nov 27 09:58 no_entry.gif
-rw-r--r--   1 mwnurnbe users       1274 Nov 27 09:58 no_entry.xpm
-rw-r--r--   1 mwnurnbe users        221 Nov 27 09:58 openfile.xbm
-rw-r--r--   1 mwnurnbe users         84 Nov 27 09:58 openfold.gif
-rw-r--r--   1 mwnurnbe users        221 Nov 27 09:58 openfold.xbm
-rw-r--r--   1 mwnurnbe users        418 Nov 27 09:58 openfold.xpm
-rw-r--r--   1 mwnurnbe users         58 Nov 27 09:58 plus.gif
-rw-r--r--   1 mwnurnbe users        195 Nov 27 09:58 plus.xbm
-rw-r--r--   1 mwnurnbe users        200 Nov 27 09:58 plus.xpm
-rw-r--r--   1 mwnurnbe users         60 Nov 27 09:58 plusarm.gif
-rw-r--r--   1 mwnurnbe users        204 Nov 27 09:58 plusarm.xbm
-rw-r--r--   1 mwnurnbe users        212 Nov 27 09:58 plusarm.xpm
-rw-r--r--   1 mwnurnbe users        305 Nov 27 09:58 resize1.xbm
-rw-r--r--   1 mwnurnbe users        305 Nov 27 09:58 resize2.xbm
-rw-r--r--   1 mwnurnbe users        281 Nov 27 09:58 restore.xbm
-rw-r--r--   1 mwnurnbe users         79 Nov 27 09:58 srcfile.gif
-rw-r--r--   1 mwnurnbe users        242 Nov 27 09:58 srcfile.xbm
-rw-r--r--   1 mwnurnbe users        294 Nov 27 09:58 srcfile.xpm
```

```
-rw-r--r--   1 mwnurnbe users        278 Nov 27 09:58 system.xbm
-rw-r--r--   1 mwnurnbe users         79 Nov 27 09:58 textfile.gif
-rw-r--r--   1 mwnurnbe users        245 Nov 27 09:58 textfile.xbm
-rw-r--r--   1 mwnurnbe users        302 Nov 27 09:58 textfile.xpm
-rw-r--r--   1 mwnurnbe users        251 Nov 27 09:58 tick
-rw-r--r--   1 mwnurnbe users        251 Nov 27 09:58 tick.xbm
-rw-r--r--   1 mwnurnbe users        180 Nov 27 09:58 warning.gif
-rw-r--r--   1 mwnurnbe users       1262 Nov 27 09:58 warning.xpm

femats/lib/tix/demos:
total 100
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:58 ./
drwxr-xr-x   5 mwnurnbe users       2048 Nov 27 09:58 ../
-rw-r--r--   1 mwnurnbe users       8991 Nov 27 09:58 MkChoose.tcl
-rw-r--r--   1 mwnurnbe users       1975 Nov 27 09:58 MkDirLis.tcl
-rw-r--r--   1 mwnurnbe users       6096 Nov 27 09:58 MkManag.tcl
-rw-r--r--   1 mwnurnbe users       9711 Nov 27 09:58 MkSample.tcl
-rw-r--r--   1 mwnurnbe users       5169 Nov 27 09:58 MkScroll.tcl
-rw-r--r--   1 mwnurnbe users        706 Nov 27 09:58 README
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:58 bitmaps/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 samples/
-rw-r--r--   1 mwnurnbe users       2341 Nov 27 09:58 tclIndex
-rwxr-xr-x   1 mwnurnbe users       7994 Nov 27 09:58 widget*

femats/lib/tix/demos/bitmaps:
total 106
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:58 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:58 ../
-rw-r--r--   1 mwnurnbe users       2310 Nov 27 09:58 about.xpm
-rw-r--r--   1 mwnurnbe users        284 Nov 27 09:58 bold.xbm
-rw-r--r--   1 mwnurnbe users        293 Nov 27 09:58 capital.xbm
-rw-r--r--   1 mwnurnbe users        293 Nov 27 09:58 centerj.xbm
-rw-r--r--   1 mwnurnbe users        896 Nov 27 09:58 combobox.xbm
-rw-r--r--   1 mwnurnbe users       2318 Nov 27 09:58 combobox.xpm
-rw-r--r--   1 mwnurnbe users        890 Nov 27 09:58 drivea.xbm
-rw-r--r--   1 mwnurnbe users       1371 Nov 27 09:58 drivea.xpm
-rw-r--r--   1 mwnurnbe users       2293 Nov 27 09:58 exit.xpm
-rw-r--r--   1 mwnurnbe users        893 Nov 27 09:58 filebox.xbm
-rw-r--r--   1 mwnurnbe users       2310 Nov 27 09:58 filebox.xpm
-rw-r--r--   1 mwnurnbe users        890 Nov 27 09:58 harddisk.xbm
-rw-r--r--   1 mwnurnbe users       1371 Nov 27 09:58 harddisk.xpm
-rw-r--r--   1 mwnurnbe users        290 Nov 27 09:58 italic.xbm
-rw-r--r--   1 mwnurnbe users        293 Nov 27 09:58 justify.xbm
-rw-r--r--   1 mwnurnbe users        287 Nov 27 09:58 leftj.xbm
-rw-r--r--   1 mwnurnbe users        884 Nov 27 09:58 netw.xbm
-rw-r--r--   1 mwnurnbe users       1386 Nov 27 09:58 netw.xpm
-rw-r--r--   1 mwnurnbe users        884 Nov 27 09:58 network.xbm
-rw-r--r--   1 mwnurnbe users       1386 Nov 27 09:58 network.xpm
-rw-r--r--   1 mwnurnbe users       2289 Nov 27 09:58 optmenu.xpm
-rw-r--r--   1 mwnurnbe users        290 Nov 27 09:58 rightj.xbm
-rw-r--r--   1 mwnurnbe users       2356 Nov 27 09:58 select.xpm
-rw-r--r--   1 mwnurnbe users      11042 Nov 27 09:58 tix.gif
-rw-r--r--   1 mwnurnbe users        299 Nov 27 09:58 underlin.xbm

femats/lib/tix/demos/samples:
total 226
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:58 ../
-rw-r--r--   1 mwnurnbe users       1556 Nov 27 09:58 Balloon.tcl
-rw-r--r--   1 mwnurnbe users       1830 Nov 27 09:58 BtnBox.tcl
-rw-r--r--   1 mwnurnbe users       1801 Nov 27 09:58 CmpImg.tcl
-rw-r--r--   1 mwnurnbe users       5822 Nov 27 09:58 CmpImg1.tcl
-rw-r--r--   1 mwnurnbe users       4354 Nov 27 09:58 CmpImg2.tcl
-rw-r--r--   1 mwnurnbe users       2369 Nov 27 09:58 CmpImg3.tcl
-rw-r--r--   1 mwnurnbe users       3350 Nov 27 09:58 ComboBox.tcl
-rw-r--r--   1 mwnurnbe users       3413 Nov 27 09:58 Control.tcl
-rw-r--r--   1 mwnurnbe users       2588 Nov 27 09:58 DirList.tcl
-rw-r--r--   1 mwnurnbe users       2564 Nov 27 09:58 DirTree.tcl
-rw-r--r--   1 mwnurnbe users       1449 Nov 27 09:58 DragDrop.tcl
-rw-r--r--   1 mwnurnbe users       3608 Nov 27 09:58 DynTree.tcl
-rw-r--r--   1 mwnurnbe users       2914 Nov 27 09:58 EFileDlg.tcl
-rw-r--r--   1 mwnurnbe users       2834 Nov 27 09:58 FileDlg.tcl
-rw-r--r--   1 mwnurnbe users       2037 Nov 27 09:58 FileEnt.tcl
-rw-r--r--   1 mwnurnbe users       4457 Nov 27 09:58 HList1.tcl
-rw-r--r--   1 mwnurnbe users       2597 Nov 27 09:58 LabEntry.tcl
-rw-r--r--   1 mwnurnbe users       2621 Nov 27 09:58 LabFrame.tcl
-rw-r--r--   1 mwnurnbe users       2854 Nov 27 09:58 ListNBK.tcl
-rw-r--r--   1 mwnurnbe users       3439 Nov 27 09:58 NoteBook.tcl
-rw-r--r--   1 mwnurnbe users       2972 Nov 27 09:58 OptMenu.tcl
-rw-r--r--   1 mwnurnbe users       4077 Nov 27 09:58 PanedWin.tcl
-rw-r--r--   1 mwnurnbe users       2198 Nov 27 09:58 PopMenu.tcl
-rw-r--r--   1 mwnurnbe users       2936 Nov 27 09:59 SHList.tcl
-rw-r--r--   1 mwnurnbe users       4938 Nov 27 09:59 SHList2.tcl
-rw-r--r--   1 mwnurnbe users       2759 Nov 27 09:59 SListBox.tcl
-rw-r--r--   1 mwnurnbe users       2379 Nov 27 09:59 SText.tcl
-rw-r--r--   1 mwnurnbe users       2553 Nov 27 09:59 SWindow.tcl
-rw-r--r--   1 mwnurnbe users        868 Nov 27 09:59 Sample.tcl
-rw-r--r--   1 mwnurnbe users       3128 Nov 27 09:59 Select.tcl
-rw-r--r--   1 mwnurnbe users       2091 Nov 27 09:59 StdBBox.tcl
-rw-r--r--   1 mwnurnbe users       2491 Nov 27 09:59 Tree.tcl
-rw-r--r--   1 mwnurnbe users       2762 Nov 27 09:59 Xpm.tcl
-rw-r--r--   1 mwnurnbe users       3290 Nov 27 09:59 Xpm1.tcl

femats/lib/tix/pref:
total 294
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:58 ./
drwxr-xr-x   5 mwnurnbe users       2048 Nov 27 09:58 ../
-rw-r--r--   1 mwnurnbe users        468 Nov 27 09:58 12Point.fs
-rw-r--r--   1 mwnurnbe users       1872 Nov 27 09:58 12Point.fsc
-rw-r--r--   1 mwnurnbe users        434 Nov 27 09:58 14Point.fs
-rw-r--r--   1 mwnurnbe users       1839 Nov 27 09:58 14Point.fsc
-rw-r--r--   1 mwnurnbe users        960 Nov 27 09:58 Bisque.cs
-rw-r--r--   1 mwnurnbe users      22556 Nov 27 09:58 Bisque.csc
-rw-r--r--   1 mwnurnbe users        979 Nov 27 09:58 Blue.cs
-rw-r--r--   1 mwnurnbe users      22571 Nov 27 09:58 Blue.csc
-rw-r--r--   1 mwnurnbe users        979 Nov 27 09:58 Gray.cs
-rw-r--r--   1 mwnurnbe users      22571 Nov 27 09:58 Gray.csc
-rw-r--r--   1 mwnurnbe users        754 Nov 27 09:58 Makefile
-rw-r--r--   1 mwnurnbe users        476 Nov 27 09:58 Old12Pt.fs
-rw-r--r--   1 mwnurnbe users        434 Nov 27 09:58 Old14Pt.fs
-rw-r--r--   1 mwnurnbe users        957 Nov 27 09:58 SGIGray.cs
-rw-r--r--   1 mwnurnbe users      22553 Nov 27 09:58 SGIGray.csc
-rw-r--r--   1 mwnurnbe users        960 Nov 27 09:58 TK.cs
-rw-r--r--   1 mwnurnbe users       1958 Nov 27 09:58 TK.csc
-rw-r--r--   1 mwnurnbe users        446 Nov 27 09:58 TK.fs
-rw-r--r--   1 mwnurnbe users        508 Nov 27 09:58 TK.fsc
-rw-r--r--   1 mwnurnbe users        957 Nov 27 09:58 TixGray.cs
-rw-r--r--   1 mwnurnbe users      22555 Nov 27 09:58 TixGray.csc
-rw-r--r--   1 mwnurnbe users       9658 Nov 27 09:58 tixmkpref

femats/lib/tk4.1:
total 328
```

```
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:54 ./
drwxr-xr-x   8 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users       2173 Nov 27 09:54 bgerror.tcl
-rw-r--r--   1 mwnurnbe users       4547 Nov 27 09:54 button.tcl
-rw-r--r--   1 mwnurnbe users      10161 Nov 27 09:54 console.tcl
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:54 demos/
-rw-r--r--   1 mwnurnbe users       4262 Nov 27 09:54 dialog.tcl
-rw-r--r--   1 mwnurnbe users      14188 Nov 27 09:54 entry.tcl
-rw-r--r--   1 mwnurnbe users       4878 Nov 27 09:54 focus.tcl
-rw-r--r--   1 mwnurnbe users      11564 Nov 27 09:54 listbox.tcl
-rw-r--r--   1 mwnurnbe users      25237 Nov 27 09:54 menu.tcl
-rw-r--r--   1 mwnurnbe users        781 Nov 27 09:54 obsolete.tcl
-rw-r--r--   1 mwnurnbe users       1641 Nov 27 09:54 optMenu.tcl
-rw-r--r--   1 mwnurnbe users       7111 Nov 27 09:54 palette.tcl
-rw-r--r--   1 mwnurnbe users       9546 Nov 27 09:54 prolog.ps
-rw-r--r--   1 mwnurnbe users       6772 Nov 27 09:54 scale.tcl
-rw-r--r--   1 mwnurnbe users      11192 Nov 27 09:54 scrlbar.tcl
-rw-r--r--   1 mwnurnbe users       8491 Nov 27 09:54 tclIndex
-rw-r--r--   1 mwnurnbe users       3686 Nov 27 09:54 tearoff.tcl
-rw-r--r--   1 mwnurnbe users      23115 Nov 27 09:54 text.tcl
-rw-r--r--   1 mwnurnbe users       3288 Nov 27 09:54 tk.tcl
-rw-r--r--   1 mwnurnbe users       3226 Nov 27 09:54 tkAppInit.c

femats/lib/tk4.1/demos:
total 496
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:54 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:54 ../
-rw-r--r--   1 mwnurnbe users       2123 Nov 27 09:54 README
-rw-r--r--   1 mwnurnbe users       7959 Nov 27 09:54 arrow.tcl
-rw-r--r--   1 mwnurnbe users       2964 Nov 27 09:54 bind.tcl
-rw-r--r--   1 mwnurnbe users       1491 Nov 27 09:54 bitmap.tcl
-rwxr-xr-x   1 mwnurnbe users       1597 Nov 27 09:54 browse*
-rw-r--r--   1 mwnurnbe users       1214 Nov 27 09:54 button.tcl
-rw-r--r--   1 mwnurnbe users       1247 Nov 27 09:54 check.tcl
-rw-r--r--   1 mwnurnbe users       5071 Nov 27 09:54 colors.tcl
-rw-r--r--   1 mwnurnbe users       2690 Nov 27 09:54 cscroll.tcl
-rw-r--r--   1 mwnurnbe users       4997 Nov 27 09:54 ctext.tcl
-rw-r--r--   1 mwnurnbe users        709 Nov 27 09:54 dialog1.tcl
-rw-r--r--   1 mwnurnbe users        661 Nov 27 09:54 dialog2.tcl
-rw-r--r--   1 mwnurnbe users       1506 Nov 27 09:54 entry1.tcl
-rw-r--r--   1 mwnurnbe users       2232 Nov 27 09:54 entry2.tcl
-rw-r--r--   1 mwnurnbe users      78837 Nov 27 09:54 floor.tcl
-rw-r--r--   1 mwnurnbe users       1120 Nov 27 09:54 form.tcl
-rwxr-xr-x   1 mwnurnbe users        493 Nov 27 09:54 hello*
-rw-r--r--   1 mwnurnbe users       1571 Nov 27 09:54 hscale.tcl
-rw-r--r--   1 mwnurnbe users       2084 Nov 27 09:54 icon.tcl
-rw-r--r--   1 mwnurnbe users        984 Nov 27 09:54 image1.tcl
-rw-r--r--   1 mwnurnbe users       2514 Nov 27 09:54 image2.tcl
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:54 images/
-rw-r--r--   1 mwnurnbe users       9590 Nov 27 09:54 items.tcl
-rwxr-xr-x   1 mwnurnbe users       7511 Nov 27 09:54 ixset*
-rw-r--r--   1 mwnurnbe users       1340 Nov 27 09:54 label.tcl
-rw-r--r--   1 mwnurnbe users       1734 Nov 27 09:54 license.terms
-rw-r--r--   1 mwnurnbe users       5142 Nov 27 09:54 menu.tcl
-rw-r--r--   1 mwnurnbe users       2844 Nov 27 09:54 plot.tcl
-rw-r--r--   1 mwnurnbe users       2400 Nov 27 09:54 puzzle.tcl
-rw-r--r--   1 mwnurnbe users       1578 Nov 27 09:54 radio.tcl
-rwxr-xr-x   1 mwnurnbe users       5292 Nov 27 09:54 rmt*
-rwxr-xr-x   1 mwnurnbe users       8133 Nov 27 09:54 rolodex*
-rw-r--r--   1 mwnurnbe users       5238 Nov 27 09:54 ruler.tcl
-rw-r--r--   1 mwnurnbe users       2062 Nov 27 09:54 sayings.tcl
-rw-r--r--   1 mwnurnbe users       4474 Nov 27 09:54 search.tcl
-rwxr-xr-x   1 mwnurnbe users       1217 Nov 27 09:54 square*
-rw-r--r--   1 mwnurnbe users       1743 Nov 27 09:54 states.tcl
-rw-r--r--   1 mwnurnbe users       6994 Nov 27 09:54 style.tcl
-rw-r--r--   1 mwnurnbe users       4068 Nov 27 09:54 tclIndex
-rwxr-xr-x   1 mwnurnbe users      11421 Nov 27 09:54 tcolor*
-rw-r--r--   1 mwnurnbe users       3238 Nov 27 09:54 text.tcl
-rwxr-xr-x   1 mwnurnbe users        909 Nov 27 09:54 timer*
-rw-r--r--   1 mwnurnbe users       6634 Nov 27 09:54 twind.tcl
-rw-r--r--   1 mwnurnbe users       1551 Nov 27 09:54 vscale.tcl
-rwxr-xr-x   1 mwnurnbe users       8360 Nov 27 09:54 widget*

femats/lib/tk4.1/demos/images:
total 602
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:54 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:54 ../
-rw-r--r--   1 mwnurnbe users      51712 Nov 27 09:54 earth.gif
-rw-r--r--   1 mwnurnbe users       6343 Nov 27 09:54 earthris.gif
-rw-r--r--   1 mwnurnbe users      12720 Nov 27 09:54 face.bmp
-rw-r--r--   1 mwnurnbe users       1886 Nov 27 09:54 flagdown.bmp
-rw-r--r--   1 mwnurnbe users       1880 Nov 27 09:54 flagup.bmp
-rw-r--r--   1 mwnurnbe users        275 Nov 27 09:54 gray25.bmp
-rw-r--r--   1 mwnurnbe users       1883 Nov 27 09:54 letters.bmp
-rw-r--r--   1 mwnurnbe users       9344 Nov 27 09:54 mickey.gif
-rw-r--r--   1 mwnurnbe users       1889 Nov 27 09:54 noletter.bmp
-rw-r--r--   1 mwnurnbe users        272 Nov 27 09:54 pattern.bmp
-rw-r--r--   1 mwnurnbe users     196623 Nov 27 09:54 teapot.ppm

femats/man:
total 42
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  4 14:43 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 man1/
drwxr-xr-x   2 mwnurnbe users      13312 Nov 27 09:55 man3/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 man5/
drwxr-xr-x   2 mwnurnbe users       4096 Nov 27 09:59 mann/

femats/man/man1:
total 134
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users        570 Nov 27 10:03 addbbox.1
-rw-r--r--   1 mwnurnbe users       4564 Nov 27 10:03 animate.1
-rw-r--r--   1 mwnurnbe users       1118 Nov 27 10:03 anytooff.1
-rw-r--r--   1 mwnurnbe users        779 Nov 27 10:03 anytoucd.1
-rw-r--r--   1 mwnurnbe users       1274 Nov 27 10:03 bdy.1
-rw-r--r--   1 mwnurnbe users       4695 Nov 27 10:03 clip.1
-rw-r--r--   1 mwnurnbe users       1687 Nov 27 10:03 geomstuff.1
-rw-r--r--   1 mwnurnbe users      12058 Nov 27 10:03 geomview.1
-rw-r--r--   1 mwnurnbe users        574 Nov 27 10:03 medit2gv.1
-rw-r--r--   1 mwnurnbe users        919 Nov 27 10:03 nose.1
-rw-r--r--   1 mwnurnbe users        791 Nov 27 10:03 offconsol.1
-rw-r--r--   1 mwnurnbe users       3137 Nov 27 10:03 polymerge.1
-rw-r--r--   1 mwnurnbe users       1385 Nov 27 10:03 pssnap.1
-r--r--r--   1 mwnurnbe users       9494 Nov 27 09:46 tclsh.1
-rw-r--r--   1 mwnurnbe users       2771 Nov 27 10:03 togeomview.1
-rw-r--r--   1 mwnurnbe users        464 Nov 27 10:03 ucdtooff.1
-r--r--r--   1 mwnurnbe users      12103 Nov 27 09:54 wish.1

femats/man/man3:
total 10338
```

```
drwxr-xr-x   2 mwnurnbe users      13312 Nov 27 09:55 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:03 ../
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 3DBorder.3
-r--r--r--   4 mwnurnbe users      10277 Nov 27 09:46 AddErrInfo.3
-r--r--r--   2 mwnurnbe users       6125 Nov 27 09:46 AllowExc.3
-r--r--r--   2 mwnurnbe users       7523 Nov 27 09:46 AppInit.3
-r--r--r--   4 mwnurnbe users       8289 Nov 27 09:46 AssocData.3
-r--r--r--   5 mwnurnbe users      11063 Nov 27 09:46 Async.3
-r--r--r--   2 mwnurnbe users       7028 Nov 27 09:46 BackgdErr.3
-r--r--r--   2 mwnurnbe users       6032 Nov 27 09:46 Backslash.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 BindTable.3
-r--r--r--   3 mwnurnbe users       6924 Nov 27 09:46 CallDel.3
-r--r--r--   7 mwnurnbe users       9487 Nov 27 09:54 CanvPsY.3
-r--r--r--   8 mwnurnbe users      11260 Nov 27 09:54 CanvTkwin.3
-r--r--r--   2 mwnurnbe users       9013 Nov 27 09:54 CanvTxtInfo.3
-r--r--r--   3 mwnurnbe users       7755 Nov 27 09:54 Clipboard.3
-r--r--r--   2 mwnurnbe users       5982 Nov 27 09:54 ClrSelect.3
-r--r--r--   2 mwnurnbe users       5734 Nov 27 09:46 CmdCmplt.3
-r--r--r--   2 mwnurnbe users       6434 Nov 27 09:46 Concat.3
-r--r--r--   6 mwnurnbe users      33349 Nov 27 09:54 ConfigWidg.3
-r--r--r--  14 mwnurnbe users      10978 Nov 27 09:54 ConfigWind.3
-r--r--r--   2 mwnurnbe users       6439 Nov 27 09:54 CoordToWin.3
-r--r--r--   9 mwnurnbe users      23025 Nov 27 09:46 CrtChannel.3
-r--r--r--   3 mwnurnbe users       8499 Nov 27 09:46 CrtChnlHdlr.3
-r--r--r--   3 mwnurnbe users       6563 Nov 27 09:46 CrtCloseHdlr.3
-r--r--r--   5 mwnurnbe users      12320 Nov 27 09:46 CrtCommand.3
-r--r--r--   3 mwnurnbe users      10999 Nov 27 09:54 CrtErrHdlr.3
-r--r--r--   3 mwnurnbe users       8239 Nov 27 09:46 CrtFileHdlr.3
-r--r--r--   3 mwnurnbe users       8083 Nov 27 09:54 CrtGenHdlr.3
-r--r--r--   2 mwnurnbe users      13364 Nov 27 09:54 CrtImgType.3
-r--r--r--   4 mwnurnbe users      10792 Nov 27 09:46 CrtInterp.3
-r--r--r--   3 mwnurnbe users      28633 Nov 27 09:54 CrtItemType.3
-r--r--r--   2 mwnurnbe users       8338 Nov 27 09:46 CrtMathFnc.3
-r--r--r--   3 mwnurnbe users       7642 Nov 27 09:46 CrtModalTmt.3
-r--r--r--   2 mwnurnbe users      14776 Nov 27 09:54 CrtPhImgFmt.3
-r--r--r--   3 mwnurnbe users       9988 Nov 27 09:54 CrtSelHdlr.3
-r--r--r--  10 mwnurnbe users      10645 Nov 27 09:46 CrtSlave.3
-r--r--r--   3 mwnurnbe users       7406 Nov 27 09:46 CrtTimerHdlr.3
-r--r--r--   3 mwnurnbe users       9262 Nov 27 09:46 CrtTrace.3
-r--r--r--  12 mwnurnbe users      10542 Nov 27 09:46 DString.3
-r--r--r--   2 mwnurnbe users       5616 Nov 27 09:54 DeleteImg.3
-r--r--r--   3 mwnurnbe users       7239 Nov 27 09:47 DetachPids.3
-r--r--r--   2 mwnurnbe users       8882 Nov 27 09:47 DoOneEvent.3
-r--r--r--   3 mwnurnbe users       8102 Nov 27 09:47 DoWhenIdle.3
-r--r--r--   2 mwnurnbe users       5870 Nov 27 09:54 DrawFocHlt.3
-r--r--r--   5 mwnurnbe users       8792 Nov 27 09:47 Eval.3
-r--r--r--   3 mwnurnbe users       7754 Nov 27 09:54 EventHndlr.3
-r--r--r--   4 mwnurnbe users       7031 Nov 27 09:47 Exit.3
-r--r--r--   5 mwnurnbe users       8593 Nov 27 09:47 ExprLong.3
-r--r--r--   2 mwnurnbe users       6211 Nov 27 09:47 FindExec.3
-r--r--r--   9 mwnurnbe users      12550 Nov 27 09:54 FindPhoto.3
-r--r--r--   2 mwnurnbe users       6636 Nov 27 09:54 FreeXId.3
-r--r--r--   3 mwnurnbe users       7519 Nov 27 09:54 GeomReq.3
-r--r--r--   3 mwnurnbe users       6976 Nov 27 09:54 GetAnchor.3
-r--r--r--   7 mwnurnbe users      12159 Nov 27 09:54 GetBitmap.3
-r--r--r--   3 mwnurnbe users       6745 Nov 27 09:54 GetCapStyl.3
-r--r--r--   3 mwnurnbe users       7473 Nov 27 09:54 GetClrmap.3
-r--r--r--   5 mwnurnbe users      10623 Nov 27 09:54 GetColor.3
-r--r--r--   5 mwnurnbe users      12883 Nov 27 09:54 GetCursor.3
-r--r--r--   4 mwnurnbe users       9763 Nov 27 09:47 GetFile.3
-r--r--r--   4 mwnurnbe users       7733 Nov 27 09:54 GetFontStr.3
-r--r--r--   3 mwnurnbe users       7540 Nov 27 09:54 GetGC.3
-r--r--r--   5 mwnurnbe users       9761 Nov 27 09:54 GetImage.3
-r--r--r--   4 mwnurnbe users       7880 Nov 27 09:47 GetInt.3
-r--r--r--   3 mwnurnbe users       6759 Nov 27 09:54 GetJoinStl.3
-r--r--r--   3 mwnurnbe users       7040 Nov 27 09:54 GetJustify.3
-r--r--r--   2 mwnurnbe users       6746 Nov 27 09:47 GetOpnFl.3
-r--r--r--   2 mwnurnbe users       6162 Nov 27 09:54 GetOption.3
-r--r--r--   3 mwnurnbe users       7183 Nov 27 09:54 GetPixels.3
-r--r--r--   3 mwnurnbe users       6453 Nov 27 09:55 GetPixmap.3
-r--r--r--   3 mwnurnbe users       6638 Nov 27 09:55 GetRelief.3
-r--r--r--   2 mwnurnbe users       6109 Nov 27 09:55 GetRootCrd.3
-r--r--r--   2 mwnurnbe users       7039 Nov 27 09:55 GetScroll.3
-r--r--r--   2 mwnurnbe users       7827 Nov 27 09:55 GetSelect.3
-r--r--r--   3 mwnurnbe users       7754 Nov 27 09:47 GetStdChan.3
-r--r--r--   3 mwnurnbe users       6381 Nov 27 09:55 GetUid.3
-r--r--r--   2 mwnurnbe users       6561 Nov 27 09:55 GetVRoot.3
-r--r--r--   2 mwnurnbe users       8281 Nov 27 09:55 GetVisual.3
-r--r--r--   2 mwnurnbe users       6372 Nov 27 09:55 HandleEvent.3
-r--r--r--  12 mwnurnbe users      13052 Nov 27 09:47 Hash.3
-r--r--r--   2 mwnurnbe users       5602 Nov 27 09:55 IdToWindow.3
-r--r--r--   2 mwnurnbe users       7174 Nov 27 09:55 ImgChanged.3
-r--r--r--   3 mwnurnbe users       6678 Nov 27 09:55 InternAtom.3
-r--r--r--   2 mwnurnbe users      10165 Nov 27 09:47 Interp.3
-r--r--r--   4 mwnurnbe users       9021 Nov 27 09:47 LinkVar.3
-r--r--r--   2 mwnurnbe users       5698 Nov 27 09:55 MainLoop.3
-r--r--r--   2 mwnurnbe users       5712 Nov 27 09:55 MainWin.3
-r--r--r--   3 mwnurnbe users       8793 Nov 27 09:55 MaintGeom.3
-r--r--r--   2 mwnurnbe users       8193 Nov 27 09:55 ManageGeom.3
-r--r--r--   3 mwnurnbe users       6389 Nov 27 09:55 MapWindow.3
-r--r--r--   2 mwnurnbe users       6907 Nov 27 09:55 MoveToplev.3
-r--r--r--   4 mwnurnbe users       8114 Nov 27 09:55 Name.3
-r--r--r--   2 mwnurnbe users       5577 Nov 27 09:55 NameOfImg.3
-r--r--r--   8 mwnurnbe users      21595 Nov 27 09:47 Notifier.3
-r--r--r--  14 mwnurnbe users      23861 Nov 27 09:47 OpenFileChnl.3
-r--r--r--   3 mwnurnbe users      10978 Nov 27 09:47 OpenTcp.3
-r--r--r--   2 mwnurnbe users       6584 Nov 27 09:55 OwnSelect.3
-r--r--r--   2 mwnurnbe users      19077 Nov 27 09:55 ParseArgv.3
-r--r--r--   3 mwnurnbe users       6632 Nov 27 09:47 PkgRequire.3
-r--r--r--   4 mwnurnbe users       8823 Nov 27 09:47 Preserve.3
-r--r--r--   2 mwnurnbe users       6281 Nov 27 09:47 PrintDbl.3
-r--r--r--   2 mwnurnbe users       6054 Nov 27 09:55 QWinEvent.3
-r--r--r--   2 mwnurnbe users       6543 Nov 27 09:47 RecordEval.3
-r--r--r--   5 mwnurnbe users       9833 Nov 27 09:47 RegExp.3
-r--r--r--   2 mwnurnbe users       6349 Nov 27 09:55 Restack.3
-r--r--r--   2 mwnurnbe users       8307 Nov 27 09:55 RestrictEv.3
-r--r--r--   2 mwnurnbe users       7099 Nov 27 09:55 SetAppName.3
-r--r--r--   3 mwnurnbe users       6780 Nov 27 09:55 SetClass.3
-r--r--r--   3 mwnurnbe users       6183 Nov 27 09:47 SetErrno.3
-r--r--r--   3 mwnurnbe users       7117 Nov 27 09:55 SetGrid.3
-r--r--r--   2 mwnurnbe users       6642 Nov 27 09:47 SetRecLmt.3
-r--r--r--   5 mwnurnbe users      10750 Nov 27 09:47 SetResult.3
-r--r--r--   7 mwnurnbe users      10707 Nov 27 09:47 SetVar.3
-r--r--r--   2 mwnurnbe users       6552 Nov 27 09:55 SetVisual.3
-r--r--r--   2 mwnurnbe users       5833 Nov 27 09:47 Sleep.3
-r--r--r--   5 mwnurnbe users      11275 Nov 27 09:47 SplitList.3
-r--r--r--   2 mwnurnbe users       7367 Nov 27 09:47 StaticPkg.3
-r--r--r--   2 mwnurnbe users       5893 Nov 27 09:47 StrMatch.3
-r--r--r--   2 mwnurnbe users       5915 Nov 27 09:55 StrictMotif.3
-r--r--r--   4 mwnurnbe users      10277 Nov 27 09:46 Tcl_AddErrorInfo.3
-r--r--r--   2 mwnurnbe users       6125 Nov 27 09:46 Tcl_AllowExceptions.3
-r--r--r--   2 mwnurnbe users       7523 Nov 27 09:46 Tcl_AppInit.3
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-r--r--r--   5 mwnurnbe users     10750 Nov 27 09:47 Tcl_AppendElement.3
-r--r--r--   5 mwnurnbe users     10750 Nov 27 09:47 Tcl_AppendResult.3
-r--r--r--   5 mwnurnbe users     11063 Nov 27 09:46 Tcl_AsyncCreate.3
-r--r--r--   5 mwnurnbe users     11063 Nov 27 09:46 Tcl_AsyncDelete.3
-r--r--r--   5 mwnurnbe users     11063 Nov 27 09:46 Tcl_AsyncInvoke.3
-r--r--r--   5 mwnurnbe users     11063 Nov 27 09:46 Tcl_AsyncMark.3
-r--r--r--   2 mwnurnbe users      7028 Nov 27 09:46 Tcl_BackgroundError.3
-r--r--r--   2 mwnurnbe users      6032 Nov 27 09:46 Tcl_Backslash.3
-r--r--r--   3 mwnurnbe users      6924 Nov 27 09:46 Tcl_CallWhenDeleted.3
-r--r--r--   3 mwnurnbe users      8102 Nov 27 09:47 Tcl_CancelIdleCall.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_Close.3
-r--r--r--   2 mwnurnbe users      5734 Nov 27 09:46 Tcl_CommandComplete.3
-r--r--r--   2 mwnurnbe users      6434 Nov 27 09:46 Tcl_Concat.3
-r--r--r--   5 mwnurnbe users     11275 Nov 27 09:47 Tcl_ConvertElement.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_CreateAlias.3
-r--r--r--   9 mwnurnbe users     23025 Nov 27 09:46 Tcl_CreateChannel.3
-r--r--r--   3 mwnurnbe users      8499 Nov 27 09:46 Tcl_CreateChannelHandler.3
-r--r--r--   3 mwnurnbe users      6563 Nov 27 09:46 Tcl_CreateCloseHandler.3
-r--r--r--   5 mwnurnbe users     12320 Nov 27 09:46 Tcl_CreateCommand.3
-r--r--r--   8 mwnurnbe users     21595 Nov 27 09:47 Tcl_CreateEventSource.3
-r--r--r--   4 mwnurnbe users      7031 Nov 27 09:47 Tcl_CreateExitHandler.3
-r--r--r--   3 mwnurnbe users      8239 Nov 27 09:46 Tcl_CreateFileHandler.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_CreateHashEntry.3
-r--r--r--   4 mwnurnbe users     10792 Nov 27 09:46 Tcl_CreateInterp.3
-r--r--r--   2 mwnurnbe users      8338 Nov 27 09:46 Tcl_CreateMathFunc.3
-r--r--r--   3 mwnurnbe users      7642 Nov 27 09:46 Tcl_CreateModalTimeout.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_CreateSlave.3
-r--r--r--   3 mwnurnbe users      7406 Nov 27 09:46 Tcl_CreateTimerHandler.3
-r--r--r--   3 mwnurnbe users      9262 Nov 27 09:46 Tcl_CreateTrace.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringAppend.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringAppendElement.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringEndSublist.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringFree.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringGetResult.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringInit.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringLength.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringResult.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringSetLength.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringStartSublist.3
-r--r--r--  12 mwnurnbe users     10542 Nov 27 09:46 Tcl_DStringValue.3
-r--r--r--   4 mwnurnbe users      8289 Nov 27 09:46 Tcl_DeleteAssocData.3
-r--r--r--   3 mwnurnbe users      8499 Nov 27 09:46 Tcl_DeleteChannelHandler.3
-r--r--r--   3 mwnurnbe users      6563 Nov 27 09:46 Tcl_DeleteCloseHandler.3
-r--r--r--   5 mwnurnbe users     12320 Nov 27 09:46 Tcl_DeleteCommand.3
-r--r--r--   8 mwnurnbe users     21595 Nov 27 09:47 Tcl_DeleteEventSource.3
-r--r--r--   4 mwnurnbe users      7031 Nov 27 09:47 Tcl_DeleteExitHandler.3
-r--r--r--   3 mwnurnbe users      8239 Nov 27 09:46 Tcl_DeleteFileHandler.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_DeleteHashEntry.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_DeleteHashTable.3
-r--r--r--   4 mwnurnbe users     10792 Nov 27 09:46 Tcl_DeleteInterp.3
-r--r--r--   3 mwnurnbe users      7642 Nov 27 09:46 Tcl_DeleteModalTimeout.3
-r--r--r--   3 mwnurnbe users      7406 Nov 27 09:46 Tcl_DeleteTimerHandler.3
-r--r--r--   3 mwnurnbe users      9262 Nov 27 09:46 Tcl_DeleteTrace.3
-r--r--r--   3 mwnurnbe users      7239 Nov 27 09:47 Tcl_DetachPids.3
-r--r--r--   2 mwnurnbe users      8882 Nov 27 09:47 Tcl_DoOneEvent.3
-r--r--r--   3 mwnurnbe users      8102 Nov 27 09:47 Tcl_DoWhenIdle.3
-r--r--r--   3 mwnurnbe users      6924 Nov 27 09:46 Tcl_DontCallWhenDeleted.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_Eof.3
-r--r--r--   5 mwnurnbe users      8792 Nov 27 09:47 Tcl_Eval.3
-r--r--r--   5 mwnurnbe users      8792 Nov 27 09:47 Tcl_EvalFile.3
-r--r--r--   4 mwnurnbe users      8823 Nov 27 09:47 Tcl_EventuallyFree.3
-r--r--r--   4 mwnurnbe users      7031 Nov 27 09:47 Tcl_Exit.3
-r--r--r--   5 mwnurnbe users      8593 Nov 27 09:47 Tcl_ExprBoolean.3
-r--r--r--   5 mwnurnbe users      8593 Nov 27 09:47 Tcl_ExprDouble.3
-r--r--r--   5 mwnurnbe users      8593 Nov 27 09:47 Tcl_ExprLong.3
-r--r--r--   5 mwnurnbe users      8593 Nov 27 09:47 Tcl_ExprString.3
-r--r--r--   8 mwnurnbe users     21595 Nov 27 09:47 Tcl_FileReady.3
-r--r--r--   2 mwnurnbe users      6211 Nov 27 09:47 Tcl_FindExecutable.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_FindHashEntry.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_FirstHashEntry.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_Flush.3
-r--r--r--   4 mwnurnbe users      9763 Nov 27 09:47 Tcl_FreeFile.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_GetAlias.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_GetAliases.3
-r--r--r--   4 mwnurnbe users      8289 Nov 27 09:46 Tcl_GetAssocData.3
-r--r--r--   4 mwnurnbe users      7880 Nov 27 09:47 Tcl_GetBoolean.3
-r--r--r--   9 mwnurnbe users     23025 Nov 27 09:46 Tcl_GetChannelBufferSize.3
-r--r--r--   9 mwnurnbe users     23025 Nov 27 09:46 Tcl_GetChannelFile.3
-r--r--r--   9 mwnurnbe users     23025 Nov 27 09:46 Tcl_GetChannelInstanceData.3
-r--r--r--   9 mwnurnbe users     23025 Nov 27 09:46 Tcl_GetChannelName.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_GetChannelOption.3
-r--r--r--   9 mwnurnbe users     23025 Nov 27 09:46 Tcl_GetChannelType.3
-r--r--r--   5 mwnurnbe users     12320 Nov 27 09:46 Tcl_GetCommandInfo.3
-r--r--r--   4 mwnurnbe users      7880 Nov 27 09:47 Tcl_GetDouble.3
-r--r--r--   3 mwnurnbe users      6183 Nov 27 09:47 Tcl_GetErrno.3
-r--r--r--   4 mwnurnbe users      9763 Nov 27 09:47 Tcl_GetFile.3
-r--r--r--   4 mwnurnbe users      9763 Nov 27 09:47 Tcl_GetFileInfo.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_GetHashKey.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_GetHashValue.3
-r--r--r--   4 mwnurnbe users      7880 Nov 27 09:47 Tcl_GetInt.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_GetMaster.3
-r--r--r--   2 mwnurnbe users      6746 Nov 27 09:47 Tcl_GetOpenFile.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_GetSlave.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_GetSlaves.3
-r--r--r--   3 mwnurnbe users      7754 Nov 27 09:47 Tcl_GetStdChannel.3
-r--r--r--   7 mwnurnbe users     10707 Nov 27 09:47 Tcl_GetVar.3
-r--r--r--   7 mwnurnbe users     10707 Nov 27 09:47 Tcl_GetVar2.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_Gets.3
-r--r--r--   5 mwnurnbe users      8792 Nov 27 09:47 Tcl_GlobalEval.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_HashStats.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_InitHashTable.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_InputBlocked.3
-r--r--r--   2 mwnurnbe users     10165 Nov 27 09:47 Tcl_Interp.3
-r--r--r--   4 mwnurnbe users     10792 Nov 27 09:46 Tcl_InterpDeleted.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_IsSafe.3
-r--r--r--   4 mwnurnbe users      9021 Nov 27 09:47 Tcl_LinkVar.3
-r--r--r--   1 mwnurnbe users      6935 Nov 27 09:47 Tcl_Main.3
-r--r--r--  10 mwnurnbe users     10645 Nov 27 09:46 Tcl_MakeSafe.3
-r--r--r--   5 mwnurnbe users     11275 Nov 27 09:47 Tcl_Merge.3
-r--r--r--  12 mwnurnbe users     13052 Nov 27 09:47 Tcl_NextHashEntry.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_OpenCommandChannel.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_OpenFileChannel.3
-r--r--r--   3 mwnurnbe users     10978 Nov 27 09:47 Tcl_OpenTcpClient.3
-r--r--r--   3 mwnurnbe users     10978 Nov 27 09:47 Tcl_OpenTcpServer.3
-r--r--r--   3 mwnurnbe users      6632 Nov 27 09:47 Tcl_PkgProvide.3
-r--r--r--   3 mwnurnbe users      6632 Nov 27 09:47 Tcl_PkgRequire.3
-r--r--r--   4 mwnurnbe users     10277 Nov 27 09:46 Tcl_PosixError.3
-r--r--r--   4 mwnurnbe users      8823 Nov 27 09:47 Tcl_Preserve.3
-r--r--r--   2 mwnurnbe users      6281 Nov 27 09:47 Tcl_PrintDouble.3
-r--r--r--   8 mwnurnbe users     21595 Nov 27 09:47 Tcl_QueueEvent.3
-r--r--r--  14 mwnurnbe users     23861 Nov 27 09:47 Tcl_Read.3
-r--r--r--   3 mwnurnbe users      7239 Nov 27 09:47 Tcl_ReapDetachedProcs.3
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-r--r--r--   2 mwnurnbe users       6543 Nov 27 09:47 Tcl_RecordAndEval.3
-r--r--r--   5 mwnurnbe users       9833 Nov 27 09:47 Tcl_RegExpCompile.3
-r--r--r--   5 mwnurnbe users       9833 Nov 27 09:47 Tcl_RegExpExec.3
-r--r--r--   5 mwnurnbe users       9833 Nov 27 09:47 Tcl_RegExpMatch.3
-r--r--r--   5 mwnurnbe users       9833 Nov 27 09:47 Tcl_RegExpRange.3
-r--r--r--   4 mwnurnbe users       8823 Nov 27 09:47 Tcl_Release.3
-r--r--r--   5 mwnurnbe users      10750 Nov 27 09:47 Tcl_ResetResult.3
-r--r--r--   5 mwnurnbe users      11275 Nov 27 09:47 Tcl_ScanElement.3
-r--r--r--  14 mwnurnbe users      23861 Nov 27 09:47 Tcl_Seek.3
-r--r--r--   4 mwnurnbe users       8289 Nov 27 09:46 Tcl_SetAssocData.3
-r--r--r--   9 mwnurnbe users      23025 Nov 27 09:46 Tcl_SetChannelBufferSize.3
-r--r--r--  14 mwnurnbe users      23861 Nov 27 09:47 Tcl_SetChannelOption.3
-r--r--r--   5 mwnurnbe users      12320 Nov 27 09:46 Tcl_SetCommandInfo.3
-r--r--r--   9 mwnurnbe users      23025 Nov 27 09:46 Tcl_SetDefaultTranslation.3
-r--r--r--   3 mwnurnbe users       6183 Nov 27 09:47 Tcl_SetErrno.3
-r--r--r--   4 mwnurnbe users      10277 Nov 27 09:46 Tcl_SetErrorCode.3
-r--r--r--  12 mwnurnbe users      13052 Nov 27 09:47 Tcl_SetHashValue.3
-r--r--r--   8 mwnurnbe users      21595 Nov 27 09:47 Tcl_SetMaxBlockTime.3
-r--r--r--   2 mwnurnbe users       6642 Nov 27 09:47 Tcl_SetRecursionLimit.3
-r--r--r--   5 mwnurnbe users      10750 Nov 27 09:47 Tcl_SetResult.3
-r--r--r--   3 mwnurnbe users       7754 Nov 27 09:47 Tcl_SetStdChannel.3
-r--r--r--   7 mwnurnbe users      10707 Nov 27 09:47 Tcl_SetVar.3
-r--r--r--   7 mwnurnbe users      10707 Nov 27 09:47 Tcl_SetVar2.3
-r--r--r--   2 mwnurnbe users       5833 Nov 27 09:47 Tcl_Sleep.3
-r--r--r--   5 mwnurnbe users      11275 Nov 27 09:47 Tcl_SplitList.3
-r--r--r--   2 mwnurnbe users       7367 Nov 27 09:47 Tcl_StaticPackage.3
-r--r--r--   2 mwnurnbe users       5893 Nov 27 09:47 Tcl_StringMatch.3
-r--r--r--  14 mwnurnbe users      23861 Nov 27 09:47 Tcl_Tell.3
-r--r--r--   7 mwnurnbe users      18918 Nov 27 09:47 Tcl_TraceVar.3
-r--r--r--   7 mwnurnbe users      18918 Nov 27 09:47 Tcl_TraceVar2.3
-r--r--r--   2 mwnurnbe users       7148 Nov 27 09:47 Tcl_TranslateFileName.3
-r--r--r--   4 mwnurnbe users       9021 Nov 27 09:47 Tcl_UnlinkVar.3
-r--r--r--   7 mwnurnbe users      10707 Nov 27 09:47 Tcl_UnsetVar.3
-r--r--r--   7 mwnurnbe users      10707 Nov 27 09:47 Tcl_UnsetVar2.3
-r--r--r--   7 mwnurnbe users      18918 Nov 27 09:47 Tcl_UntraceVar.3
-r--r--r--   7 mwnurnbe users      18918 Nov 27 09:47 Tcl_UntraceVar2.3
-r--r--r--   3 mwnurnbe users       7547 Nov 27 09:47 Tcl_UpVar.3
-r--r--r--   3 mwnurnbe users       7547 Nov 27 09:47 Tcl_UpVar2.3
-r--r--r--   4 mwnurnbe users       9021 Nov 27 09:47 Tcl_UpdateLinkedVar.3
-r--r--r--   5 mwnurnbe users       8792 Nov 27 09:47 Tcl_VarEval.3
-r--r--r--   7 mwnurnbe users      18918 Nov 27 09:47 Tcl_VarTraceInfo.3
-r--r--r--   7 mwnurnbe users      18918 Nov 27 09:47 Tcl_VarTraceInfo2.3
-r--r--r--   8 mwnurnbe users      21595 Nov 27 09:47 Tcl_WaitForEvent.3
-r--r--r--   8 mwnurnbe users      21595 Nov 27 09:47 Tcl_WatchFile.3
-r--r--r--  14 mwnurnbe users      23861 Nov 27 09:47 Tcl_Write.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_3DBorderColor.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_3DBorderGC.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_3DHorizontalBevel.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_3DVerticalBevel.3
-r--r--r--  21 mwnurnbe users       9671 Nov 27 09:55 Tk_Attributes.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 Tk_BindEvent.3
-r--r--r--   8 mwnurnbe users      11260 Nov 27 09:54 Tk_CanvasDrawableCoords.3
-r--r--r--   8 mwnurnbe users      11260 Nov 27 09:54 Tk_CanvasEventuallyRedraw.3
-r--r--r--   8 mwnurnbe users      11260 Nov 27 09:54 Tk_CanvasGetCoord.3
-r--r--r--   7 mwnurnbe users       9487 Nov 27 09:54 Tk_CanvasPsBitmap.3
-r--r--r--   7 mwnurnbe users       9487 Nov 27 09:54 Tk_CanvasPsColor.3
-r--r--r--   7 mwnurnbe users       9487 Nov 27 09:54 Tk_CanvasPsFont.3
-r--r--r--   7 mwnurnbe users       9487 Nov 27 09:54 Tk_CanvasPsPath.3
-r--r--r--   7 mwnurnbe users       9487 Nov 27 09:54 Tk_CanvasPsStipple.3
-r--r--r--   7 mwnurnbe users       9487 Nov 27 09:54 Tk_CanvasPsY.3
-r--r--r--   8 mwnurnbe users      11260 Nov 27 09:54 Tk_CanvasSetStippleOrigin.3
-r--r--r--   8 mwnurnbe users      11260 Nov 27 09:54 Tk_CanvasTagsOption.3
-r--r--r--   2 mwnurnbe users       9013 Nov 27 09:54 Tk_CanvasTextInfo.3
-r--r--r--   8 mwnurnbe users      11260 Nov 27 09:54 Tk_CanvasTkwin.3
-r--r--r--   8 mwnurnbe users      11260 Nov 27 09:54 Tk_CanvasWindowCoords.3
-r--r--r--  14 mwnurnbe users      10978 Nov 27 09:54 Tk_ChangeWindowAttributes.3
-r--r--r--  21 mwnurnbe users       9671 Nov 27 09:55 Tk_Changes.3
-r--r--r--   3 mwnurnbe users       6780 Nov 27 09:55 Tk_Class.3
-r--r--r--   2 mwnurnbe users       5982 Nov 27 09:54 Tk_ClearSelection.3
-r--r--r--   3 mwnurnbe users       7755 Nov 27 09:54 Tk_ClipboardAppend.3
-r--r--r--   3 mwnurnbe users       7755 Nov 27 09:54 Tk_ClipboardClear.3
-r--r--r--  21 mwnurnbe users       9671 Nov 27 09:55 Tk_Colormap.3
-r--r--r--   6 mwnurnbe users      33349 Nov 27 09:54 Tk_ConfigureInfo.3
-r--r--r--   6 mwnurnbe users      33349 Nov 27 09:54 Tk_ConfigureValue.3
-r--r--r--   6 mwnurnbe users      33349 Nov 27 09:54 Tk_ConfigureWidget.3
-r--r--r--  14 mwnurnbe users      10978 Nov 27 09:54 Tk_ConfigureWindow.3
-r--r--r--   2 mwnurnbe users       6439 Nov 27 09:54 Tk_CoordsToWindow.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 Tk_CreateBinding.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 Tk_CreateBindingTable.3
-r--r--r--   3 mwnurnbe users      10999 Nov 27 09:54 Tk_CreateErrorHandler.3
-r--r--r--   3 mwnurnbe users       7754 Nov 27 09:54 Tk_CreateEventHandler.3
-r--r--r--   3 mwnurnbe users       8083 Nov 27 09:54 Tk_CreateGenericHandler.3
-r--r--r--   2 mwnurnbe users      13364 Nov 27 09:54 Tk_CreateImageType.3
-r--r--r--   3 mwnurnbe users      28633 Nov 27 09:54 Tk_CreateItemType.3
-r--r--r--   2 mwnurnbe users      14776 Nov 27 09:54 Tk_CreatePhotoImageFormat.3
-r--r--r--   3 mwnurnbe users       9988 Nov 27 09:54 Tk_CreateSelHandler.3
-r--r--r--   7 mwnurnbe users      12159 Nov 27 09:54 Tk_DefineBitmap.3
-r--r--r--  14 mwnurnbe users      10978 Nov 27 09:54 Tk_DefineCursor.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 Tk_DeleteAllBindings.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 Tk_DeleteBinding.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 Tk_DeleteBindingTable.3
-r--r--r--   3 mwnurnbe users      10999 Nov 27 09:54 Tk_DeleteErrorHandler.3
-r--r--r--   3 mwnurnbe users       7754 Nov 27 09:54 Tk_DeleteEventHandler.3
-r--r--r--   3 mwnurnbe users       8083 Nov 27 09:54 Tk_DeleteGenericHandler.3
-r--r--r--   2 mwnurnbe users       5616 Nov 27 09:54 Tk_DeleteImage.3
-r--r--r--   3 mwnurnbe users       9988 Nov 27 09:54 Tk_DeleteSelHandler.3
-r--r--r--  21 mwnurnbe users       9671 Nov 27 09:55 Tk_Depth.3
-r--r--r--  21 mwnurnbe users       9671 Nov 27 09:55 Tk_Display.3
-r--r--r--  21 mwnurnbe users       9671 Nov 27 09:55 Tk_DisplayName.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_Draw3DPolygon.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_Draw3DRectangle.3
-r--r--r--   2 mwnurnbe users       5870 Nov 27 09:54 Tk_DrawFocusHighlight.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_Fill3DPolygon.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_Fill3DRectangle.3
-r--r--r--   9 mwnurnbe users      12550 Nov 27 09:54 Tk_FindPhoto.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_Free3DBorder.3
-r--r--r--   7 mwnurnbe users      12159 Nov 27 09:54 Tk_FreeBitmap.3
-r--r--r--   5 mwnurnbe users      10623 Nov 27 09:54 Tk_FreeColor.3
-r--r--r--   3 mwnurnbe users       7473 Nov 27 09:54 Tk_FreeColormap.3
-r--r--r--   5 mwnurnbe users      12883 Nov 27 09:54 Tk_FreeCursor.3
-r--r--r--   4 mwnurnbe users       7733 Nov 27 09:54 Tk_FreeFontStruct.3
-r--r--r--   3 mwnurnbe users       7540 Nov 27 09:54 Tk_FreeGC.3
-r--r--r--   5 mwnurnbe users       9761 Nov 27 09:54 Tk_FreeImage.3
-r--r--r--   6 mwnurnbe users      33349 Nov 27 09:54 Tk_FreeOptions.3
-r--r--r--   3 mwnurnbe users       6453 Nov 27 09:55 Tk_FreePixmap.3
-r--r--r--   2 mwnurnbe users       6636 Nov 27 09:54 Tk_FreeXId.3
-r--r--r--   3 mwnurnbe users       7519 Nov 27 09:54 Tk_GeometryRequest.3
-r--r--r--  13 mwnurnbe users      16884 Nov 27 09:54 Tk_Get3DBorder.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 Tk_GetAllBindings.3
-r--r--r--   3 mwnurnbe users       6976 Nov 27 09:54 Tk_GetAnchor.3
-r--r--r--   3 mwnurnbe users       6678 Nov 27 09:55 Tk_GetAtomName.3
-r--r--r--   9 mwnurnbe users      11399 Nov 27 09:54 Tk_GetBinding.3
```

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-r--r--r--   7 mwnurnbe users     12159 Nov 27 09:54 Tk_GetBitmap.3
-r--r--r--   7 mwnurnbe users     12159 Nov 27 09:54 Tk_GetBitmapFromData.3
-r--r--r--   3 mwnurnbe users      6745 Nov 27 09:54 Tk_GetCapStyle.3
-r--r--r--   5 mwnurnbe users     10623 Nov 27 09:54 Tk_GetColor.3
-r--r--r--   5 mwnurnbe users     10623 Nov 27 09:54 Tk_GetColorByValue.3
-r--r--r--   3 mwnurnbe users      7473 Nov 27 09:54 Tk_GetColormap.3
-r--r--r--   5 mwnurnbe users     12883 Nov 27 09:54 Tk_GetCursor.3
-r--r--r--   5 mwnurnbe users     12883 Nov 27 09:54 Tk_GetCursorFromData.3
-r--r--r--   4 mwnurnbe users      7733 Nov 27 09:54 Tk_GetFontStruct.3
-r--r--r--   3 mwnurnbe users      7540 Nov 27 09:54 Tk_GetGC.3
-r--r--r--   5 mwnurnbe users      9761 Nov 27 09:54 Tk_GetImage.3
-r--r--r--   3 mwnurnbe users     28633 Nov 27 09:54 Tk_GetItemTypes.3
-r--r--r--   3 mwnurnbe users      6759 Nov 27 09:54 Tk_GetJoinStyle.3
-r--r--r--   3 mwnurnbe users      7040 Nov 27 09:54 Tk_GetJustify.3
-r--r--r--   2 mwnurnbe users      6162 Nov 27 09:54 Tk_GetOption.3
-r--r--r--   3 mwnurnbe users      7183 Nov 27 09:54 Tk_GetPixels.3
-r--r--r--   3 mwnurnbe users      6453 Nov 27 09:55 Tk_GetPixmap.3
-r--r--r--   3 mwnurnbe users      6638 Nov 27 09:55 Tk_GetRelief.3
-r--r--r--   2 mwnurnbe users      6109 Nov 27 09:55 Tk_GetRootCoords.3
-r--r--r--   3 mwnurnbe users      7183 Nov 27 09:54 Tk_GetScreenMM.3
-r--r--r--   2 mwnurnbe users      7039 Nov 27 09:55 Tk_GetScrollInfo.3
-r--r--r--   2 mwnurnbe users      7827 Nov 27 09:55 Tk_GetSelection.3
-r--r--r--   3 mwnurnbe users      6381 Nov 27 09:55 Tk_GetUid.3
-r--r--r--   2 mwnurnbe users      6561 Nov 27 09:55 Tk_GetVRootGeometry.3
-r--r--r--   2 mwnurnbe users      8281 Nov 27 09:55 Tk_GetVisual.3
-r--r--r--   2 mwnurnbe users      6372 Nov 27 09:55 Tk_HandleEvent.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_Height.3
-r--r--r--   2 mwnurnbe users      5602 Nov 27 09:55 Tk_IdToWindow.3
-r--r--r--   2 mwnurnbe users      7174 Nov 27 09:55 Tk_ImageChanged.3
-r--r--r--   1 mwnurnbe users      6222 Nov 27 09:55 Tk_Init.3
-r--r--r--   3 mwnurnbe users      6678 Nov 27 09:55 Tk_InternAtom.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_InternalBorderWidth.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_IsMapped.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_IsTopLevel.3
-r--r--r--   1 mwnurnbe users      6917 Nov 27 09:55 Tk_Main.3
-r--r--r--   2 mwnurnbe users      5698 Nov 27 09:55 Tk_MainLoop.3
-r--r--r--   2 mwnurnbe users      5712 Nov 27 09:55 Tk_MainWindow.3
-r--r--r--   3 mwnurnbe users      8793 Nov 27 09:55 Tk_MaintainGeometry.3
-r--r--r--   2 mwnurnbe users      8193 Nov 27 09:55 Tk_ManageGeometry.3
-r--r--r--   3 mwnurnbe users      6389 Nov 27 09:55 Tk_MapWindow.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_MoveResizeWindow.3
-r--r--r--   2 mwnurnbe users      6907 Nov 27 09:55 Tk_MoveToplevelWindow.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_MoveWindow.3
-r--r--r--   4 mwnurnbe users      8114 Nov 27 09:55 Tk_Name.3
-r--r--r--  13 mwnurnbe users     16884 Nov 27 09:54 Tk_NameOf3DBorder.3
-r--r--r--   3 mwnurnbe users      6976 Nov 27 09:54 Tk_NameOfAnchor.3
-r--r--r--   7 mwnurnbe users     12159 Nov 27 09:54 Tk_NameOfBitmap.3
-r--r--r--   3 mwnurnbe users      6745 Nov 27 09:54 Tk_NameOfCapStyle.3
-r--r--r--   5 mwnurnbe users     10623 Nov 27 09:54 Tk_NameOfColor.3
-r--r--r--   5 mwnurnbe users     12883 Nov 27 09:54 Tk_NameOfCursor.3
-r--r--r--   4 mwnurnbe users      7733 Nov 27 09:54 Tk_NameOfFontStruct.3
-r--r--r--   2 mwnurnbe users      5577 Nov 27 09:55 Tk_NameOfImage.3
-r--r--r--   3 mwnurnbe users      6759 Nov 27 09:54 Tk_NameOfJoinStyle.3
-r--r--r--   3 mwnurnbe users      7040 Nov 27 09:54 Tk_NameOfJustify.3
-r--r--r--   3 mwnurnbe users      6638 Nov 27 09:55 Tk_NameOfRelief.3
-r--r--r--   4 mwnurnbe users      8114 Nov 27 09:55 Tk_NameToWindow.3
-r--r--r--   6 mwnurnbe users     33349 Nov 27 09:54 Tk_Offset.3
-r--r--r--   2 mwnurnbe users      6584 Nov 27 09:55 Tk_OwnSelection.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_Parent.3
-r--r--r--   2 mwnurnbe users     19077 Nov 27 09:55 Tk_ParseArgv.3
-r--r--r--   4 mwnurnbe users      8114 Nov 27 09:55 Tk_PathName.3
-r--r--r--   9 mwnurnbe users     12550 Nov 27 09:54 Tk_PhotoBlank.3
-r--r--r--   9 mwnurnbe users     12550 Nov 27 09:54 Tk_PhotoExpand.3
-r--r--r--   9 mwnurnbe users     12550 Nov 27 09:54 Tk_PhotoGetImage.3
-r--r--r--   9 mwnurnbe users     12550 Nov 27 09:54 Tk_PhotoGetSize.3
-r--r--r--   9 mwnurnbe users     12550 Nov 27 09:54 Tk_PhotoPutBlock.3
-r--r--r--   9 mwnurnbe users     12550 Nov 27 09:54 Tk_PhotoPutZoomedBlock.3
-r--r--r--   9 mwnurnbe users     12550 Nov 27 09:54 Tk_PhotoSetSize.3
-r--r--r--   2 mwnurnbe users      6054 Nov 27 09:55 Tk_QueueWindowEvent.3
-r--r--r--   5 mwnurnbe users      9761 Nov 27 09:54 Tk_RedrawImage.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_ReqHeight.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_ReqWidth.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_ResizeWindow.3
-r--r--r--   2 mwnurnbe users      6349 Nov 27 09:55 Tk_RestackWindow.3
-r--r--r--   2 mwnurnbe users      8307 Nov 27 09:55 Tk_RestrictEvents.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_Screen.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_ScreenNumber.3
-r--r--r--   2 mwnurnbe users      7099 Nov 27 09:55 Tk_SetAppName.3
-r--r--r--  13 mwnurnbe users     16884 Nov 27 09:54 Tk_SetBackgroundFromBorder.3
-r--r--r--   3 mwnurnbe users      6780 Nov 27 09:55 Tk_SetClass.3
-r--r--r--   3 mwnurnbe users      7117 Nov 27 09:55 Tk_SetGrid.3
-r--r--r--   3 mwnurnbe users      7519 Nov 27 09:54 Tk_SetInternalBorder.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_SetWindowBackground.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_SetWindowBackgroundPixmap.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_SetWindowBorder.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_SetWindowBorderPixmap.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_SetWindowBorderWidth.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_SetWindowColormap.3
-r--r--r--   2 mwnurnbe users      6552 Nov 27 09:55 Tk_SetWindowVisual.3
-r--r--r--   7 mwnurnbe users     12159 Nov 27 09:54 Tk_SizeOfBitmap.3
-r--r--r--   5 mwnurnbe users      9761 Nov 27 09:54 Tk_SizeOfImage.3
-r--r--r--   2 mwnurnbe users      5915 Nov 27 09:55 Tk_StrictMotif.3
-r--r--r--   3 mwnurnbe users      6381 Nov 27 09:55 Tk_Uid.3
-r--r--r--  14 mwnurnbe users     10978 Nov 27 09:54 Tk_UndefineCursor.3
-r--r--r--   3 mwnurnbe users      8793 Nov 27 09:55 Tk_UnmaintainGeometry.3
-r--r--r--   3 mwnurnbe users      6389 Nov 27 09:55 Tk_UnmapWindow.3
-r--r--r--   3 mwnurnbe users      7117 Nov 27 09:55 Tk_UnsetGrid.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_Visual.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_Width.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_WindowId.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_X.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 Tk_Y.3
-r--r--r--   7 mwnurnbe users     18918 Nov 27 09:47 TraceVar.3
-r--r--r--   2 mwnurnbe users      7148 Nov 27 09:47 Translate.3
-r--r--r--   3 mwnurnbe users      7547 Nov 27 09:47 UpVar.3
-r--r--r--  21 mwnurnbe users      9671 Nov 27 09:55 WindowId.3

femats/man/man5:
total 176
drwxr-xr-x   2 mwnurnbe users      1024 Nov 27 10:03 ./
drwxr-xr-x   6 mwnurnbe users      1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users      4959 Nov 27 10:03 discgrp.5
-rw-r--r--   1 mwnurnbe users     43282 Nov 27 10:03 geomview.5
-rw-r--r--   1 mwnurnbe users     38011 Nov 27 10:03 oogl.5

femats/man/mann:
total 4248
drwxr-xr-x   2 mwnurnbe users      4096 Nov 27 09:59 ./
drwxr-xr-x   6 mwnurnbe users      1024 Nov 27 10:03 ../
-r--r--r--   1 mwnurnbe users     15450 Nov 27 09:59 Balloon.n
-r--r--r--   1 mwnurnbe users     14284 Nov 27 09:59 BtnBox.n
-r--r--r--   1 mwnurnbe users     23684 Nov 27 09:59 ComboBox.n
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-r--r--r--   1 mwnurnbe users      20468 Nov 27 09:59 Control.n
-r--r--r--   1 mwnurnbe users      22694 Nov 27 09:59 DItem.n
-r--r--r--   1 mwnurnbe users       9197 Nov 27 09:59 Destroy.n
-r--r--r--   1 mwnurnbe users      16275 Nov 27 09:59 DirList.n
-r--r--r--   1 mwnurnbe users      15747 Nov 27 09:59 DirTree.n
-r--r--r--   1 mwnurnbe users      18037 Nov 27 09:59 EFileBox.n
-r--r--r--   1 mwnurnbe users      13299 Nov 27 09:59 EFileDlg.n
-r--r--r--   1 mwnurnbe users      15628 Nov 27 09:59 FileBox.n
-r--r--r--   1 mwnurnbe users      13445 Nov 27 09:59 FileDlg.n
-r--r--r--   1 mwnurnbe users      17937 Nov 27 09:59 FileEnt.n
-r--r--r--   1 mwnurnbe users      22706 Nov 27 09:59 Form.n
-r--r--r--   1 mwnurnbe users       9456 Nov 27 09:59 GetBool.n
-r--r--r--   1 mwnurnbe users       9482 Nov 27 09:59 GetInt.n
-r--r--r--   1 mwnurnbe users      46609 Nov 27 09:59 HList.n
-r--r--r--   1 mwnurnbe users      12231 Nov 27 09:59 InpOnly.n
-r--r--r--   1 mwnurnbe users      13901 Nov 27 09:59 LabEntry.n
-r--r--r--   1 mwnurnbe users      14325 Nov 27 09:59 LabFrame.n
-r--r--r--   1 mwnurnbe users      16597 Nov 27 09:59 ListNBK.n
-r--r--r--   1 mwnurnbe users      11630 Nov 27 09:59 Mwm.n
-r--r--r--   1 mwnurnbe users      11826 Nov 27 09:59 NBFrame.n
-r--r--r--   1 mwnurnbe users      18440 Nov 27 09:59 NoteBook.n
-r--r--r--   1 mwnurnbe users      16981 Nov 27 09:59 OptMenu.n
-r--r--r--   1 mwnurnbe users      19307 Nov 27 09:59 PanedWin.n
-r--r--r--   1 mwnurnbe users      15649 Nov 27 09:59 PopMenu.n
-r--r--r--   1 mwnurnbe users      13833 Nov 27 09:59 SHList.n
-r--r--r--   1 mwnurnbe users      15652 Nov 27 09:59 SListBox.n
-r--r--r--   1 mwnurnbe users      13813 Nov 27 09:59 SText.n
-r--r--r--   1 mwnurnbe users      15260 Nov 27 09:59 SWindow.n
-r--r--r--   1 mwnurnbe users      19028 Nov 27 09:59 Select.n
-r--r--r--   1 mwnurnbe users      14262 Nov 27 09:59 StdBBox.n
-r--r--r--   1 mwnurnbe users      11762 Nov 27 09:47 Tcl.n
-r--r--r--   1 mwnurnbe users      10165 Nov 27 09:59 TixIntro.n
-r--r--r--   1 mwnurnbe users      17714 Nov 27 09:59 Tree.n
-r--r--r--   1 mwnurnbe users      10452 Nov 27 09:59 Utils.n
-r--r--r--   1 mwnurnbe users      10078 Nov 27 09:59 Wm.n
-r--r--r--   1 mwnurnbe users       9078 Nov 27 09:47 after.n
-r--r--r--   1 mwnurnbe users       5718 Nov 27 09:47 append.n
-r--r--r--   1 mwnurnbe users       9550 Nov 27 09:47 array.n
-r--r--r--   1 mwnurnbe users       5799 Nov 27 09:55 bell.n
-r--r--r--   1 mwnurnbe users       7572 Nov 27 09:47 bgerror.n
-r--r--r--   1 mwnurnbe users      22886 Nov 27 09:55 bind.n
-r--r--r--   1 mwnurnbe users       7888 Nov 27 09:55 bindtags.n
-r--r--r--   1 mwnurnbe users       8935 Nov 27 09:55 bitmap.n
-r--r--r--   1 mwnurnbe users       5805 Nov 27 09:47 break.n
-r--r--r--   1 mwnurnbe users      11517 Nov 27 09:55 button.n
-r--r--r--   1 mwnurnbe users      72607 Nov 27 09:55 canvas.n
-r--r--r--   1 mwnurnbe users       7307 Nov 27 09:47 case.n
-r--r--r--   1 mwnurnbe users       6279 Nov 27 09:47 catch.n
-r--r--r--   1 mwnurnbe users       5480 Nov 27 09:47 cd.n
-r--r--r--   1 mwnurnbe users      14720 Nov 27 09:55 checkbutton.n
-r--r--r--   1 mwnurnbe users       8250 Nov 27 09:55 clipboard.n
-r--r--r--   1 mwnurnbe users      10871 Nov 27 09:47 clock.n
-r--r--r--   1 mwnurnbe users       6879 Nov 27 09:47 close.n
-r--r--r--   1 mwnurnbe users      18368 Nov 27 09:59 compound.n
-r--r--r--   1 mwnurnbe users       5774 Nov 27 09:47 concat.n
-r--r--r--   1 mwnurnbe users       5829 Nov 27 09:47 continue.n
-r--r--r--   1 mwnurnbe users       5671 Nov 27 09:55 destroy.n
-r--r--r--   2 mwnurnbe users       6853 Nov 27 09:55 dialog.n
-r--r--r--   1 mwnurnbe users      22535 Nov 27 09:55 entry.n
-r--r--r--   1 mwnurnbe users       5459 Nov 27 09:47 eof.n
-r--r--r--   1 mwnurnbe users       6929 Nov 27 09:47 error.n
-r--r--r--   1 mwnurnbe users       5662 Nov 27 09:47 eval.n
-r--r--r--   1 mwnurnbe users      11535 Nov 27 09:47 exec.n
-r--r--r--   1 mwnurnbe users       5441 Nov 27 09:47 exit.n
-r--r--r--   1 mwnurnbe users      15621 Nov 27 09:47 expr.n
-r--r--r--   1 mwnurnbe users       5712 Nov 27 09:47 fblocked.n
-r--r--r--   1 mwnurnbe users      12635 Nov 27 09:47 fconfigure.n
-r--r--r--   1 mwnurnbe users      12448 Nov 27 09:47 file.n
-r--r--r--   1 mwnurnbe users       9768 Nov 27 09:47 fileevent.n
-r--r--r--   1 mwnurnbe users      12554 Nov 27 09:47 filename.n
-r--r--r--   1 mwnurnbe users       5957 Nov 27 09:47 flush.n
-r--r--r--   1 mwnurnbe users       9642 Nov 27 09:55 focus.n
-r--r--r--   4 mwnurnbe users       7193 Nov 27 09:55 focusNext.n
-r--r--r--   1 mwnurnbe users       6347 Nov 27 09:47 for.n
-r--r--r--   1 mwnurnbe users       7543 Nov 27 09:47 foreach.n
-r--r--r--   1 mwnurnbe users      13456 Nov 27 09:47 format.n
-r--r--r--   1 mwnurnbe users       9656 Nov 27 09:55 frame.n
-r--r--r--   1 mwnurnbe users       6603 Nov 27 09:47 gets.n
-r--r--r--   1 mwnurnbe users       7682 Nov 27 09:47 glob.n
-r--r--r--   1 mwnurnbe users       5692 Nov 27 09:47 global.n
-r--r--r--   1 mwnurnbe users       9846 Nov 27 09:55 grab.n
-r--r--r--   1 mwnurnbe users      15711 Nov 27 09:55 grid.n
-r--r--r--   1 mwnurnbe users      11287 Nov 27 09:47 history.n
-r--r--r--   1 mwnurnbe users       6444 Nov 27 09:47 if.n
-r--r--r--   1 mwnurnbe users       7982 Nov 27 09:55 image.n
-r--r--r--   1 mwnurnbe users       5720 Nov 27 09:47 incr.n
-r--r--r--   1 mwnurnbe users      11357 Nov 27 09:47 info.n
-r--r--r--   1 mwnurnbe users      21804 Nov 27 09:47 interp.n
-r--r--r--   1 mwnurnbe users       5622 Nov 27 09:47 join.n
-r--r--r--   1 mwnurnbe users       8891 Nov 27 09:55 label.n
-r--r--r--   1 mwnurnbe users       5973 Nov 27 09:47 lappend.n
-r--r--r--   1 mwnurnbe users      11695 Nov 27 09:47 library.n
-r--r--r--   1 mwnurnbe users       5888 Nov 27 09:47 lindex.n
-r--r--r--   1 mwnurnbe users       5867 Nov 27 09:47 linsert.n
-r--r--r--   1 mwnurnbe users       6130 Nov 27 09:47 list.n
-r--r--r--   1 mwnurnbe users      24381 Nov 27 09:55 listbox.n
-r--r--r--   1 mwnurnbe users       5420 Nov 27 09:47 llength.n
-r--r--r--   1 mwnurnbe users       9256 Nov 27 09:47 load.n
-r--r--r--   1 mwnurnbe users       5994 Nov 27 09:55 lower.n
-r--r--r--   1 mwnurnbe users       6166 Nov 27 09:47 lrange.n
-r--r--r--   1 mwnurnbe users       6395 Nov 27 09:47 lreplace.n
-r--r--r--   1 mwnurnbe users       6212 Nov 27 09:47 lsearch.n
-r--r--r--   1 mwnurnbe users       6510 Nov 27 09:47 lsort.n
-r--r--r--   1 mwnurnbe users      31899 Nov 27 09:55 menu.n
-r--r--r--   3 mwnurnbe users       5840 Nov 27 09:55 menubar.n
-r--r--r--   1 mwnurnbe users      13081 Nov 27 09:55 menubutton.n
-r--r--r--   1 mwnurnbe users      11072 Nov 27 09:55 message.n
-r--r--r--   1 mwnurnbe users       9207 Nov 27 09:47 open.n
-r--r--r--   1 mwnurnbe users       8348 Nov 27 09:55 option.n
-r--r--r--   2 mwnurnbe users       6194 Nov 27 09:55 optionMenu.n
-r--r--r--   1 mwnurnbe users      22313 Nov 27 09:55 options.n
-r--r--r--   1 mwnurnbe users      12606 Nov 27 09:55 pack-old.n
-r--r--r--   1 mwnurnbe users      15427 Nov 27 09:55 pack.n
-r--r--r--   1 mwnurnbe users      13531 Nov 27 09:47 package.n
-r--r--r--   3 mwnurnbe users       7853 Nov 27 09:55 palette.n
-r--r--r--   1 mwnurnbe users      20729 Nov 27 09:55 photo.n
-r--r--r--   1 mwnurnbe users       5844 Nov 27 09:47 pid.n
-r--r--r--   1 mwnurnbe users      11546 Nov 27 09:59 pixmap.n
-r--r--r--   2 mwnurnbe users       9965 Nov 27 09:47 pkgMkIndex.n
-r--r--r--   2 mwnurnbe users       9965 Nov 27 09:47 pkg_mkIndex.n
-r--r--r--   1 mwnurnbe users      15097 Nov 27 09:55 place.n
-r--r--r--   2 mwnurnbe users       5795 Nov 27 09:55 popup.n
```

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-r--r--r--   1 mwnurnbe users       7677 Nov 27 09:47 proc.n
-r--r--r--   1 mwnurnbe users       7574 Nov 27 09:47 puts.n
-r--r--r--   1 mwnurnbe users       5352 Nov 27 09:47 pwd.n
-r--r--r--   1 mwnurnbe users      14525 Nov 27 09:55 radiobutton.n
-r--r--r--   1 mwnurnbe users       5994 Nov 27 09:55 raise.n
-r--r--r--   1 mwnurnbe users       6503 Nov 27 09:47 read.n
-r--r--r--   1 mwnurnbe users      11016 Nov 27 09:47 regexp.n
-r--r--r--   1 mwnurnbe users       7530 Nov 27 09:47 regsub.n
-r--r--r--   1 mwnurnbe users       5548 Nov 27 09:47 rename.n
-r--r--r--   1 mwnurnbe users       7928 Nov 27 09:47 return.n
-r--r--r--   1 mwnurnbe users      15492 Nov 27 09:55 scale.n
-r--r--r--   1 mwnurnbe users      10282 Nov 27 09:47 scan.n
-r--r--r--   1 mwnurnbe users      19160 Nov 27 09:55 scrollbar.n
-r--r--r--   1 mwnurnbe users       6736 Nov 27 09:47 seek.n
-r--r--r--   1 mwnurnbe users      11270 Nov 27 09:55 selection.n
-r--r--r--   1 mwnurnbe users       8397 Nov 27 09:55 send.n
-r--r--r--   1 mwnurnbe users       6102 Nov 27 09:47 set.n
-r--r--r--   1 mwnurnbe users      10091 Nov 27 09:47 socket.n
-r--r--r--   1 mwnurnbe users       6458 Nov 27 09:47 source.n
-r--r--r--   1 mwnurnbe users       6123 Nov 27 09:47 split.n
-r--r--r--   1 mwnurnbe users      10001 Nov 27 09:47 string.n
-r--r--r--   1 mwnurnbe users       6447 Nov 27 09:47 subst.n
-r--r--r--   1 mwnurnbe users       8319 Nov 27 09:47 switch.n
-r--r--r--   1 mwnurnbe users      13857 Nov 27 09:47 tclvars.n
-r--r--r--   1 mwnurnbe users       5499 Nov 27 09:47 tell.n
-r--r--r--   1 mwnurnbe users      71266 Nov 27 09:55 text.n
-r--r--r--   1 mwnurnbe users       5660 Nov 27 09:47 time.n
-r--r--r--   1 mwnurnbe users      16500 Nov 27 09:59 tix.n
-r--r--r--   1 mwnurnbe users      15080 Nov 27 09:59 tixwish.1
-r--r--r--   1 mwnurnbe users       6546 Nov 27 09:55 tk.n
-r--r--r--   3 mwnurnbe users       5840 Nov 27 09:55 tk_bindForTraversal.n
-r--r--r--   3 mwnurnbe users       7853 Nov 27 09:55 tk_bisque.n
-r--r--r--   2 mwnurnbe users       6853 Nov 27 09:55 tk_dialog.n
-r--r--r--   4 mwnurnbe users       7193 Nov 27 09:55 tk_focusFollowsMouse.n
-r--r--r--   4 mwnurnbe users       7193 Nov 27 09:55 tk_focusNext.n
-r--r--r--   4 mwnurnbe users       7193 Nov 27 09:55 tk_focusPrev.n
-r--r--r--   3 mwnurnbe users       5840 Nov 27 09:55 tk_menuBar.n
-r--r--r--   2 mwnurnbe users       6194 Nov 27 09:55 tk_optionMenu.n
-r--r--r--   2 mwnurnbe users       5795 Nov 27 09:55 tk_popup.n
-r--r--r--   3 mwnurnbe users       7853 Nov 27 09:55 tk_setPalette.n
-r--r--r--   1 mwnurnbe users       7453 Nov 27 09:55 tkerror.n
-r--r--r--   1 mwnurnbe users       7743 Nov 27 09:55 tkvars.n
-r--r--r--   1 mwnurnbe users       6605 Nov 27 09:55 tkwait.n
-r--r--r--   1 mwnurnbe users      10229 Nov 27 09:55 toplevel.n
-r--r--r--   1 mwnurnbe users      11372 Nov 27 09:47 trace.n
-r--r--r--   1 mwnurnbe users       8073 Nov 27 09:47 unknown.n
-r--r--r--   1 mwnurnbe users       5859 Nov 27 09:47 unset.n
-r--r--r--   1 mwnurnbe users       6649 Nov 27 09:47 update.n
-r--r--r--   1 mwnurnbe users       7490 Nov 27 09:47 uplevel.n
-r--r--r--   1 mwnurnbe users       7898 Nov 27 09:47 upvar.n
-r--r--r--   1 mwnurnbe users       6084 Nov 27 09:47 vwait.n
-r--r--r--   1 mwnurnbe users       6056 Nov 27 09:47 while.n
-r--r--r--   1 mwnurnbe users      18264 Nov 27 09:55 winfo.n
-r--r--r--   1 mwnurnbe users      30632 Nov 27 09:55 wm.n

femats/src:
total 26
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x   9 mwnurnbe users       1024 Mar  4 14:43 ../
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 Geomview1.5/
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 Tix4.0.5/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:03 archive/
drwxr-xr-x   2 mwnurnbe users       1024 Feb 24 17:33 gui/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:06 postproc/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:15 preproc/
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:03 prism/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:42 solver/
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 tcl7.5/
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 tk4.1/
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:59 xmgr-3.01pl7/

femats/src/Geomview1.5:
total 184
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users      35370 Dec  2  1994 CHANGES
-rw-r--r--   1 mwnurnbe users       1717 Jan 28  1993 COPYING
-rw-r--r--   1 mwnurnbe users       5112 Dec 14  1994 INSTALL
-rw-r--r--   1 mwnurnbe users       6260 Dec 14  1994 MANIFEST
-rw-r--r--   1 mwnurnbe users      10933 Dec 12  1994 README
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 bin/
-rwxr-xr-x   1 mwnurnbe users        585 Nov 27 10:02 build_Geomview1.5*
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:02 data/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 doc/
-rwxr-xr-x   1 mwnurnbe users       2647 Nov 27 10:02 geomview*
-rwxr-xr-x   1 mwnurnbe users       2614 Nov 27 10:02 geomview.old*
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 include/
-rwxr-xr-x   1 mwnurnbe users      10659 Dec 14  1994 install*
-rw-r--r--   1 mwnurnbe users       3037 Nov 27 10:03 install.log
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:02 man/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 maple/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 mathematica/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 modules/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 tools/

femats/src/Geomview1.5/bin:
total 6
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 x11/

femats/src/Geomview1.5/bin/x11:
total 6086
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 ../
-rwxr-xr-x   1 mwnurnbe users     282624 Dec 14  1994 anytooff*
-rwxr-xr-x   1 mwnurnbe users     290816 Dec 14  1994 anytoucd*
-rwxr-xr-x   1 mwnurnbe users     286720 Dec 14  1994 bdy*
-rwxr-xr-x   1 mwnurnbe users     290816 Dec 14  1994 clip*
-rwxr-xr-x   1 mwnurnbe users        734 Mar  9  1992 geomstuff*
-rwxr-xr-x   1 mwnurnbe users       2588 Dec 14  1994 geomview*
-rwxr-xr-x   1 mwnurnbe users     884736 Dec 14  1994 gvx*
-rwxr-xr-x   1 mwnurnbe users      24576 Dec 14  1994 math2oogl*
-rwxr-xr-x   1 mwnurnbe users       1024 Aug 31  1992 medit2gv*
-rwxr-xr-x   1 mwnurnbe users     278528 Dec 14  1994 offconsol*
-rwxr-xr-x   1 mwnurnbe users     356352 Dec 14  1994 oogl2rib*
-rwxr-xr-x   1 mwnurnbe users      36864 Dec 14  1994 polymerge*
-rwxr-xr-x   1 mwnurnbe users      16384 Dec 14  1994 togeomview*
-rwxr-xr-x   1 mwnurnbe users     274432 Dec 14  1994 ucdtooff*

femats/src/Geomview1.5/data:
total 22
```

```
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users       1487 Sep 30  1994 .geomview
-rw-r--r--   1 mwnurnbe users       1967 Nov  1  1992 cmap.fmap
drwxr-xr-x   6 mwnurnbe users       2048 Nov 27 10:02 geom/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 groups/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 shaders/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 things/

femats/src/Geomview1.5/data/geom:
total 1524
drwxr-xr-x   6 mwnurnbe users       2048 Nov 27 10:02 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:02 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 4d/
-rw-r--r--   1 mwnurnbe users       1469 Oct 23  1992 abstr.off
-rw-r--r--   1 mwnurnbe users        159 Feb 18  1992 antoine0.oogl
-rw-r--r--   1 mwnurnbe users       2407 Feb 18  1992 antoine1.oogl
-rw-r--r--   1 mwnurnbe users       2623 Feb 18  1992 antoine2.oogl
-rw-r--r--   1 mwnurnbe users       2623 Feb 18  1992 antoine3.oogl
-rw-r--r--   1 mwnurnbe users       2306 Jan 31  1993 axes.list
-rw-r--r--   1 mwnurnbe users      34199 Jun 12  1992 br2.grp
-rw-r--r--   1 mwnurnbe users        888 Oct 22  1992 br2.off
-rw-r--r--   1 mwnurnbe users      20570 Sep  4  1992 br4.2
-rw-r--r--   1 mwnurnbe users       3331 Feb 18  1993 br4fd.grp
-rw-r--r--   1 mwnurnbe users       2370 Sep  4  1992 br4fd.list
-rw-r--r--   1 mwnurnbe users         94 Mar 25  1993 cam.off
-rw-r--r--   1 mwnurnbe users        584 Nov  5  1993 camera-frustum
-rw-r--r--   1 mwnurnbe users      15587 Jul 26  1994 catenoid
-rw-r--r--   1 mwnurnbe users       1087 Sep  3  1992 cone.off
-rw-r--r--   1 mwnurnbe users         71 Jun  5  1992 csquare.quad
-rw-r--r--   1 mwnurnbe users        359 Oct  3  1992 cube
-rw-r--r--   1 mwnurnbe users        362 Feb 16  1993 cube.off
-rw-r--r--   1 mwnurnbe users        373 Jan 25  1993 diamond
-rw-r--r--   1 mwnurnbe users        908 Jan 25  1993 dodec
-rw-r--r--   1 mwnurnbe users        787 Feb  4  1992 dodec.off
-rw-r--r--   1 mwnurnbe users       6895 Apr 20  1994 dodec.quad
-rw-r--r--   1 mwnurnbe users        812 Jan 29  1992 dodec2.off
-rw-r--r--   1 mwnurnbe users        374 Feb  1  1992 facecube.off
-rw-r--r--   1 mwnurnbe users       1010 Jun  2  1992 hdodec.off
-rw-r--r--   1 mwnurnbe users      17626 Jul 26  1994 helicoid
-rw-r--r--   1 mwnurnbe users        542 Oct 11  1992 hypercube.off
-rw-r--r--   1 mwnurnbe users       5979 Jan 29  1992 ico.grp
-rw-r--r--   1 mwnurnbe users        689 Jun 28  1992 icosa.off
-rw-r--r--   1 mwnurnbe users      38870 Jan 29  1992 icosa.quad
-rw-r--r--   1 mwnurnbe users       3258 Mar 15  1992 jungle.list
-rw-r--r--   1 mwnurnbe users     109873 Jul 20  1993 klein8
-rw-r--r--   1 mwnurnbe users        437 Jun 12  1992 link2.grp
-rw-r--r--   1 mwnurnbe users        864 Jun 12  1992 link8.grp
-rw-r--r--   1 mwnurnbe users       3570 May 28  1992 moebius.4d.mesh
-rw-r--r--   1 mwnurnbe users      16605 Feb 25  1992 mushroom.off
-rw-r--r--   1 mwnurnbe users         70 Jan 29  1992 nsquare.quad
-rw-r--r--   1 mwnurnbe users        210 Sep 19  1994 octa.off
-rw-r--r--   1 mwnurnbe users        341 Jul 13  1994 octant.bez
-rw-r--r--   1 mwnurnbe users     304817 Jan  5  1993 office.oogl
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 pieces/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 polyhedra/
-rw-r--r--   1 mwnurnbe users        195 Jun 30  1994 ref.inst
-rw-r--r--   1 mwnurnbe users         72 Feb  1  1992 ref.list
-rw-r--r--   1 mwnurnbe users        211 Jun 12  1992 ref1.grp
-rw-r--r--   1 mwnurnbe users        713 Jun 12  1992 ref2.list
-rw-r--r--   1 mwnurnbe users       4185 Jan 29  1992 sample.mesh
-rw-r--r--   1 mwnurnbe users      10746 Jan 29  1992 sph12.mesh
-rw-r--r--   1 mwnurnbe users       2478 Feb 12  1992 sphere.mesh
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 spherical/
-rw-r--r--   1 mwnurnbe users         34 Jan 28  1992 square.quad
-rw-r--r--   1 mwnurnbe users      12319 May 28  1992 teapot.bez
-rw-r--r--   1 mwnurnbe users        166 Feb  1  1992 tent.mesh
-rw-r--r--   1 mwnurnbe users        185 Jan 25  1993 tetra
-rw-r--r--   1 mwnurnbe users        181 Jan 29  1992 tetra.off
-rw-r--r--   1 mwnurnbe users        508 Sep  3  1992 torus.bez
-rw-r--r--   1 mwnurnbe users       1814 Jul 26  1994 torus3.oogl
-rw-r--r--   1 mwnurnbe users       2205 Jul 26  1994 torus8.oogl
-rw-r--r--   1 mwnurnbe users        474 May 28  1992 trapezoid.4d.off
-rw-r--r--   1 mwnurnbe users      13797 Jun 29  1992 tref.mesh
-rw-r--r--   1 mwnurnbe users      41107 Feb 11  1992 tref.off
-rw-r--r--   1 mwnurnbe users        150 May 28  1992 tri.4d.vect
-rw-r--r--   1 mwnurnbe users        137 Jan 29  1992 tri.vect
-rw-r--r--   1 mwnurnbe users        275 Jan 25  1993 triangle
-rw-r--r--   1 mwnurnbe users        289 Sep  1  1992 twosidedsquare.quad
-rw-r--r--   1 mwnurnbe users         15 Aug 12  1993 unit.sphere
-rw-r--r--   1 mwnurnbe users        238 Jan 23  1994 unitcube.off
-rw-r--r--   1 mwnurnbe users        411 Feb  1  1992 vertcube.off
-rw-r--r--   1 mwnurnbe users         80 Jun 30  1994 warp.inst
-rw-r--r--   1 mwnurnbe users        167 Feb  1  1992 wraptent.mesh
-rw-r--r--   1 mwnurnbe users        559 Apr 15  1992 xwyezed.vect
-rw-r--r--   1 mwnurnbe users        567 Jan 29  1992 xyz.grp
-rw-r--r--   1 mwnurnbe users        270 Feb  1  1992 xyz.vect
-rw-r--r--   1 mwnurnbe users         28 Feb  1  1992 ztent.mesh

femats/src/Geomview1.5/data/geom/4d:
total 58
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   6 mwnurnbe users       2048 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users       3349 Jul 28  1993 4daxes
-rw-r--r--   1 mwnurnbe users        798 Sep  3  1992 hypercube.4d.off
-rw-r--r--   1 mwnurnbe users       3570 Feb 11  1992 moebius.4d.mesh
-rw-r--r--   1 mwnurnbe users       2646 Feb 11  1992 octant.4d.mesh
-rw-r--r--   1 mwnurnbe users      11423 Feb 11  1992 sphere.4d.mesh
-rw-r--r--   1 mwnurnbe users        474 Feb 11  1992 trapezoid.4d.off
-rw-r--r--   1 mwnurnbe users        150 Feb 11  1992 tri.4d.vect

femats/src/Geomview1.5/data/geom/pieces:
total 12
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   6 mwnurnbe users       2048 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users        340 Jun 12  1992 cube1.off
-rw-r--r--   1 mwnurnbe users        333 Jun 12  1992 linkA.bez
-rw-r--r--   1 mwnurnbe users        645 Jun 12  1992 linkB.bez

femats/src/Geomview1.5/data/geom/polyhedra:
total 72
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   6 mwnurnbe users       2048 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users        314 Jun 26  1992 cube
-rw-r--r--   1 mwnurnbe users        555 Jun 26  1992 cuboctahedron
-rw-r--r--   1 mwnurnbe users        787 Jun 26  1992 dodecahedron
-rw-r--r--   1 mwnurnbe users        529 Jun 26  1992 icosahedron
-rw-r--r--   1 mwnurnbe users       1365 Jun 26  1992 icosidodecahedron
-rw-r--r--   1 mwnurnbe users        226 Jun 26  1992 octahedron
-rw-r--r--   1 mwnurnbe users       2768 Jun 26  1992 rhombicosidodecahedron
-rw-r--r--   1 mwnurnbe users       1047 Jun 26  1992 rhombicuboctahedron
-rw-r--r--   1 mwnurnbe users       2005 Jun 26  1992 rhombitruncated_cubeoctahedron
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-rw-r--r--   1 mwnurnbe users       4920 Jun 26  1992 rhombitruncated_icosidodecahedron
-rw-r--r--   1 mwnurnbe users        916 Jun 26  1992 snub_cube
-rw-r--r--   1 mwnurnbe users       2657 Jun 26  1992 snub_dodecahedron
-rw-r--r--   1 mwnurnbe users        149 Jun 26  1992 tetrahedron
-rw-r--r--   1 mwnurnbe users       1019 Jun 26  1992 truncated_cube
-rw-r--r--   1 mwnurnbe users       2512 Jun 26  1992 truncated_dodecahedron
-rw-r--r--   1 mwnurnbe users       2486 Jun 26  1992 truncated_icosahedron
-rw-r--r--   1 mwnurnbe users        891 Jun 26  1992 truncated_octahedron
-rw-r--r--   1 mwnurnbe users        305 Jun 26  1992 truncated_tetrahedron

femats/src/Geomview1.5/data/geom/spherical:
total 260
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   6 mwnurnbe users       2048 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users      34438 Jun 17  1993 dodecaplex.off
-rw-r--r--   1 mwnurnbe users      13838 Aug 25  1992 flattorus.mesh
-rw-r--r--   1 mwnurnbe users        858 Jun 17  1993 hypercube.off
-rw-r--r--   1 mwnurnbe users       1454 Jun 17  1993 octaplex.off
-rw-r--r--   1 mwnurnbe users        337 Jun 17  1993 orthoplex.off
-rw-r--r--   1 mwnurnbe users      27471 Jan 19  1993 ruledtorus.mesh
-rw-r--r--   1 mwnurnbe users        320 Jun 17  1993 simplex.off
-rw-r--r--   1 mwnurnbe users      18714 Jun 17  1993 tetraplex.off
-rw-r--r--   1 mwnurnbe users      28380 Oct 11  1992 twosided.flattorus

femats/src/Geomview1.5/data/groups:
total 554
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users       2894 Jan 22  1993 101a.dgp
-rw-r--r--   1 mwnurnbe users       3358 Jan 22  1993 101b.dgp
-rw-r--r--   1 mwnurnbe users       3023 Mar 18  1993 120.dgp
-rw-r--r--   1 mwnurnbe users       5108 Feb 12  1992 230data
-rw-r--r--   1 mwnurnbe users       3733 Feb 12  1992 230data.Conway
-rw-r--r--   1 mwnurnbe users        199 Feb 12  1992 230data.lat
-rw-r--r--   1 mwnurnbe users       2659 Feb 12  1992 230data.names
-rw-r--r--   1 mwnurnbe users       1833 Mar 18  1993 3torus.dgp
-rw-r--r--   1 mwnurnbe users       1760 Feb  3  1993 3torus2.dgp
-rw-r--r--   1 mwnurnbe users       4333 Jan 22  1993 94a.dgp
-rw-r--r--   1 mwnurnbe users       4337 Jan 22  1993 94b.dgp
-rw-r--r--   1 mwnurnbe users       2896 Mar 18  1993 borrom.dgp
-rw-r--r--   1 mwnurnbe users        558 Mar 19  1993 borrom2.dgp
-rw-r--r--   1 mwnurnbe users       2897 Jan 22  1993 borrom3.dgp
-rw-r--r--   1 mwnurnbe users       3520 Apr 22  1994 borrom4.dgp
-rw-r--r--   1 mwnurnbe users       3511 Mar 18  1993 borrom4.wa
-rw-r--r--   1 mwnurnbe users       3476 Aug 12  1993 dodec.vect
-rw-r--r--   1 mwnurnbe users       1969 Jan 22  1993 fig8.dgp
-rw-r--r--   1 mwnurnbe users       3796 Jun 13  1993 g233.prj
-rw-r--r--   1 mwnurnbe users       7664 Jun 13  1993 g234.prj
-rw-r--r--   1 mwnurnbe users      19608 Jun 13  1993 g235.prj
-rw-r--r--   1 mwnurnbe users      47656 Jun 13  1993 g236.prj
-rw-r--r--   1 mwnurnbe users      74907 Jun 13  1993 g237.prj
-rw-r--r--   1 mwnurnbe users       1955 Apr 22  1994 good_klein_quick.dgp
-rw-r--r--   1 mwnurnbe users        533 Apr 22  1994 hook.off
-rw-r--r--   1 mwnurnbe users        556 Mar  9  1993 klein.wa
-rw-r--r--   1 mwnurnbe users       3432 Apr 22  1994 klein_whole.dgp
-rw-r--r--   1 mwnurnbe users       3519 Apr 22  1994 notknot.dgp
-rw-r--r--   1 mwnurnbe users       5734 Jan 22  1993 sample.proj.dgp
-rw-r--r--   1 mwnurnbe users       2206 Jan 22  1993 sample.uhs.dgp
-rw-r--r--   1 mwnurnbe users      37108 Nov 19  1993 spaceshipSpace.geom
-rw-r--r--   1 mwnurnbe users        851 Jan 22  1993 tetra2.dgp
-rw-r--r--   1 mwnurnbe users       4289 Apr 22  1994 wholecube.geom

femats/src/Geomview1.5/data/shaders:
total 44
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users        116 Sep 22  1992 README
-rw-r--r--   1 mwnurnbe users       1401 Jan 25  1993 hlight.sl
-rw-r--r--   1 mwnurnbe users       1828 Sep 22  1992 hlight.slo
-rw-r--r--   1 mwnurnbe users        874 Sep 22  1992 hmatte.sl
-rw-r--r--   1 mwnurnbe users       2245 Sep 22  1992 hmatte.slo
-rw-r--r--   1 mwnurnbe users       4213 Jan 25  1993 hplastic.sl
-rw-r--r--   1 mwnurnbe users       5317 Sep 22  1992 hplastic.slo

femats/src/Geomview1.5/data/things:
total 2104
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users       1010 Dec 12  1994 color_dodec.off
-rw-r--r--   1 mwnurnbe users        374 Dec 12  1994 color_face_cube.off
-rw-r--r--   1 mwnurnbe users         71 Dec 12  1994 color_square.quad
-rw-r--r--   1 mwnurnbe users      14243 Dec 12  1994 color_teapot.bez
-rw-r--r--   1 mwnurnbe users        411 Dec 12  1994 color_vertex_cube.off
-rw-r--r--   1 mwnurnbe users       1087 Dec 12  1994 cone.off
-rw-r--r--   1 mwnurnbe users      13558 Dec 12  1994 cross.off
-rw-r--r--   1 mwnurnbe users        787 Dec 12  1994 dodec.off
-rw-r--r--   1 mwnurnbe users      20724 Dec 12  1994 dragon.off
-rw-r--r--   1 mwnurnbe users      84127 Dec 12  1994 epcot.off
-rw-r--r--   1 mwnurnbe users      37133 Dec 12  1994 goblet.off
-rw-r--r--   1 mwnurnbe users      71992 Dec 12  1994 head.off
-rw-r--r--   1 mwnurnbe users      23085 Dec 12  1994 helix2.off
-rw-r--r--   1 mwnurnbe users       5979 Dec 12  1994 ico_star.inst
-rw-r--r--   1 mwnurnbe users       3258 Dec 12  1994 jungle_gym.off
-rw-r--r--   1 mwnurnbe users      15873 Dec 12  1994 king.off
-rw-r--r--   1 mwnurnbe users      16605 Dec 12  1994 mushroom.off
-rw-r--r--   1 mwnurnbe users      65119 Dec 12  1994 pear.off
-rw-r--r--   1 mwnurnbe users         71 Dec 12  1994 redgreen_square.quad
-rw-r--r--   1 mwnurnbe users      94557 Dec 12  1994 seashell.off
-rw-r--r--   1 mwnurnbe users       4185 Dec 12  1994 sinewave.mesh
-rw-r--r--   1 mwnurnbe users     114261 Dec 12  1994 space_shuttle.off
-rw-r--r--   1 mwnurnbe users     271319 Dec 12  1994 space_station.off
-rw-r--r--   1 mwnurnbe users       2478 Dec 12  1994 sphere.mesh
-rw-r--r--   1 mwnurnbe users      13501 Dec 12  1994 sphere2.off
-rw-r--r--   1 mwnurnbe users        275 Dec 12  1994 sphere_half.bez
-rw-r--r--   1 mwnurnbe users         34 Dec 12  1994 square.quad
-rw-r--r--   1 mwnurnbe users      12319 Dec 12  1994 teapot.bez
-rw-r--r--   1 mwnurnbe users        508 Dec 12  1994 torus.bez
-rw-r--r--   1 mwnurnbe users      13797 Dec 12  1994 trefoil_knot.mesh
-rw-r--r--   1 mwnurnbe users        437 Dec 12  1994 two_hole_torus.inst
-rw-r--r--   1 mwnurnbe users      86080 Dec 12  1994 volkswagon.off
-rw-r--r--   1 mwnurnbe users      40704 Dec 12  1994 x29_plane.off
-rw-r--r--   1 mwnurnbe users        270 Dec 12  1994 xyz.vect

femats/src/Geomview1.5/doc:
total 4836
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users       6814 Mar  2  1993 4dview.tutorial
-rw-r--r--   1 mwnurnbe users        247 Dec 10  1994 FILES
-rw-r--r--   1 mwnurnbe users        213 Dec  2  1994 Makedefs
-rw-r--r--   1 mwnurnbe users       1988 Nov 22  1993 Makefile
-rw-r--r--   1 mwnurnbe users      17312 Jul  7  1994 OOGL.m.doc
```

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-rw-r--r--   1 mwnurnbe users       1311 Nov 16  1993 README
-rw-r--r--   1 mwnurnbe users       2014 Sep  1  1993 example1.c
-rw-r--r--   1 mwnurnbe users       3579 Sep  1  1993 example2.c
-rw-r--r--   1 mwnurnbe users       6729 Sep  1  1993 example3.c
-rw-r--r--   1 mwnurnbe users       2290 Oct 21  1994 geomview
-rw-r--r--   1 mwnurnbe users      51182 Oct 21  1994 geomview-1
-rw-r--r--   1 mwnurnbe users      50854 Oct 21  1994 geomview-2
-rw-r--r--   1 mwnurnbe users      55086 Oct 21  1994 geomview-3
-rw-r--r--   1 mwnurnbe users      51636 Oct 21  1994 geomview-4
-rw-r--r--   1 mwnurnbe users      39975 Oct 21  1994 geomview-5
-rw-r--r--   1 mwnurnbe users    1684080 Oct 21  1994 geomview.ps
-rw-r--r--   1 mwnurnbe users     255917 Oct 21  1994 geomview.tex
-rw-r--r--   1 mwnurnbe users       7780 Dec  2  1994 gvplot.doc
-rw-r--r--   1 mwnurnbe users       8127 Mar  1  1993 newsletter_article.txt
-rw-r--r--   1 mwnurnbe users      19135 Jul  7  1994 oogltour
-rw-r--r--   1 mwnurnbe users      42538 Sep  1  1993 texinfmt.el
-rw-r--r--   1 mwnurnbe users     119415 Sep  7  1993 texinfo.tex

femats/src/Geomview1.5/include:
total 10
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users       2349 Aug 18  1993 pickfunc.h

femats/src/Geomview1.5/man:
total 8
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 man1/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 man5/

femats/src/Geomview1.5/man/man1:
total 90
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users        570 Dec  5  1994 addbbox.1
-rw-r--r--   1 mwnurnbe users       4564 Dec 12  1994 animate.1
-rw-r--r--   1 mwnurnbe users       1118 Nov  2  1993 anytooff.1
-rw-r--r--   1 mwnurnbe users        779 Oct 22  1992 anytoucd.1
-rw-r--r--   1 mwnurnbe users       1274 Feb 26  1993 bdy.1
-rw-r--r--   1 mwnurnbe users       4695 Nov 26  1994 clip.1
-rw-r--r--   1 mwnurnbe users       1687 Apr 21  1992 geomstuff.1
-rw-r--r--   1 mwnurnbe users      12058 Nov 11  1994 geomview.1
-rw-r--r--   1 mwnurnbe users        574 Mar  2  1992 medit2gv.1
-rw-r--r--   1 mwnurnbe users        919 Sep  1  1992 nose.1
-rw-r--r--   1 mwnurnbe users        791 Sep 21  1992 offconsol.1
-rw-r--r--   1 mwnurnbe users       3137 Jul 25  1993 polymerge.1
-rw-r--r--   1 mwnurnbe users       1385 Oct 21  1992 pssnap.1
-rw-r--r--   1 mwnurnbe users       2771 May 24  1994 togeomview.1
-rw-r--r--   1 mwnurnbe users        464 Nov  5  1993 ucdtooff.1

femats/src/Geomview1.5/man/man5:
total 176
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users       4959 Nov 19  1993 discgrp.5
-rw-r--r--   1 mwnurnbe users      43282 Nov 10  1994 geomview.5
-rw-r--r--   1 mwnurnbe users      38011 Nov 15  1993 oog1.5

femats/src/Geomview1.5/maple:
total 150
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users       3725 Dec 14  1994 Makefile
-rw-r--r--   1 mwnurnbe users       7817 Dec  7  1994 README.gvplot
-rw-r--r--   1 mwnurnbe users      23798 Nov 27 10:03 gvplot
-rw-r--r--   1 mwnurnbe users      12536 Nov 27 10:03 gvplot.m
-rw-r--r--   1 mwnurnbe users      23774 Nov 27  1994 gvplot.mapleV3

femats/src/Geomview1.5/mathematica:
total 34
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users       2682 Nov 19  1993 BezierPlot.m
-rw-r--r--   1 mwnurnbe users        706 Oct 27  1993 Geomview.m
-rw-r--r--   1 mwnurnbe users      11221 Nov 17  1994 OOGL.m

femats/src/Geomview1.5/modules:
total 6
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 x11/

femats/src/Geomview1.5/modules/x11:
total 1564
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:02 ../
-rw-r--r--   1 mwnurnbe users         46 Dec 14  1994 .geomview-addbbox
-rw-r--r--   1 mwnurnbe users         38 Dec 14  1994 .geomview-animate
-rw-r--r--   1 mwnurnbe users         38 Dec 14  1994 .geomview-drawbdy
-rw-r--r--   1 mwnurnbe users         34 Dec 14  1994 .geomview-gvclock
-rw-r--r--   1 mwnurnbe users         31 Dec 14  1994 .geomview-nose
-rw-r--r--   1 mwnurnbe users         40 Dec 14  1994 .geomview-pssnap
-rwxr-xr-x   1 mwnurnbe users     274432 Dec 14  1994 addbbox*
-rwxr-xr-x   1 mwnurnbe users      73728 Dec 14  1994 animate*
-rwxr-xr-x   1 mwnurnbe users        235 Dec 14  1994 drawbdy*
-rwxr-xr-x   1 mwnurnbe users       4724 Dec 14  1994 gvclock*
-rwxr-xr-x   1 mwnurnbe users      73728 Dec 14  1994 nose*
-rwxr-xr-x   1 mwnurnbe users     344064 Dec 14  1994 pssnap*

femats/src/Geomview1.5/tools:
total 76
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:02 ./
drwxr-xr-x  11 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users        169 Dec 12  1994 FILES
-rw-r--r--   1 mwnurnbe users        163 Dec 12  1994 Makedefs
-rw-r--r--   1 mwnurnbe users        109 Aug 31  1992 Makefile
-rw-r--r--   1 mwnurnbe users       2978 Dec 13  1994 Makefile.install-bin
-rwxr-xr-x   1 mwnurnbe users        500 Aug 31  1992 add-deps*
-rwxr-xr-x   1 mwnurnbe users        342 Nov 15  1993 dirseq*
-rwxr-xr-x   1 mwnurnbe users       1034 Nov 28  1994 dist-exceptions*
-rwxr-xr-x   1 mwnurnbe users       2020 Sep  1  1994 distlist*
-rwxr-xr-x   1 mwnurnbe users       1257 Dec 13  1994 inst*
-rwxr-xr-x   1 mwnurnbe users       1592 Dec 13  1994 install.bsd*
-rwxr-xr-x   1 mwnurnbe users        852 Nov 19  1993 installmodule*
-rwxr-xr-x   1 mwnurnbe users        357 Nov 14  1993 insuredir*
-rwxr-xr-x   1 mwnurnbe users       7808 Mar 13  1994 lisp2c*
-rwxr-xr-x   1 mwnurnbe users       1046 Aug 28  1992 listdirs*
-rwxr-xr-x   1 mwnurnbe users       1319 Aug 29  1992 manlist*
-rwxr-xr-x   1 mwnurnbe users       3634 Sep  1  1994 mkdep*
-rwxr-xr-x   1 mwnurnbe users       1329 Dec 12  1994 writabletar*
```

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femats/src/Tix4.0.5:
total 394
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-------   1 mwnurnbe users       4369 May 19  1996 ABOUT.html
-rw-r--r--   1 mwnurnbe users       4197 May 19  1996 ABOUT.txt
-rw-r--r--   1 mwnurnbe users       9075 Nov 27 09:55 Makefile
-rw-r--r--   1 mwnurnbe users       8903 Apr 23  1996 Makefile.in
-rw-------   1 mwnurnbe users       3001 May 19  1996 README.html
-rw-r--r--   1 mwnurnbe users       2534 May 19  1996 README.txt
-rw-r--r--   1 mwnurnbe users         37 May 20  1996 Version
-rw-r--r--   1 mwnurnbe users       2052 Nov 27 09:55 config.cache
-rw-r--r--   1 mwnurnbe users        305 Nov 27 09:55 config.log
-rwxr-xr-x   1 mwnurnbe users       5928 Nov 27 09:55 config.status*
-rwxr-xr-x   1 mwnurnbe users      84675 May 20  1996 configure*
-rw-r--r--   1 mwnurnbe users      26286 May 19  1996 configure.in
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 09:55 demos/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 docs/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 generic/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 include/
-rwxr--r--   1 mwnurnbe users       2186 Jan 31  1996 install.sh*
drwxr-xr-x   4 mwnurnbe users       2048 Nov 27 09:55 library/
-rw-r--r--   1 mwnurnbe users       1822 May 19  1996 license.tcl
-rw-------   1 mwnurnbe users       2401 May 19  1996 license.terms
drwxr-xr-x   3 mwnurnbe users       2048 Nov 27 09:55 man/
-rwxr--r--   1 mwnurnbe users      17028 May 19  1996 setup*
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 test/
-rw-r--r--   1 mwnurnbe users        611 Nov 27 09:55 tixConfig.tcl
-rw-r--r--   1 mwnurnbe users        739 Feb  8  1996 tixConfig.tcl.in
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 tools/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 unix-et-tk4.0/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:55 unix-itcl2.0/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 unix-tk4.0/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:58 unix-tk4.1/

femats/src/Tix4.0.5/demos:
total 102
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       8991 May 16  1996 MkChoose.tcl
-rw-r--r--   1 mwnurnbe users       1975 May 12  1996 MkDirLis.tcl
-rw-r--r--   1 mwnurnbe users       6096 May 12  1996 MkManag.tcl
-rw-r--r--   1 mwnurnbe users       9711 May 20  1996 MkSample.tcl
-rw-r--r--   1 mwnurnbe users       5169 May 16  1996 MkScroll.tcl
-rw-r--r--   1 mwnurnbe users        706 May 12  1996 README
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 bitmaps/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:55 c-code/
drwxr-xr-x   2 mwnurnbe users         24 Nov 27 09:55 et/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 samples/
-rw-r--r--   1 mwnurnbe users       2341 Apr  8  1996 tclIndex
-rwxr--r--   1 mwnurnbe users       7994 May 16  1996 widget*

femats/src/Tix4.0.5/demos/bitmaps:
total 106
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       2310 Feb  2  1996 about.xpm
-rw-r--r--   1 mwnurnbe users        284 Feb  2  1996 bold.xbm
-rw-r--r--   1 mwnurnbe users        293 Feb  2  1996 capital.xbm
-rw-r--r--   1 mwnurnbe users        293 Feb  2  1996 centerj.xbm
-rw-r--r--   1 mwnurnbe users        896 Feb  2  1996 combobox.xbm
-rw-r--r--   1 mwnurnbe users       2318 Feb  2  1996 combobox.xpm
-rw-r--r--   1 mwnurnbe users        890 May 12  1996 drivea.xbm
-rw-r--r--   1 mwnurnbe users       1371 May 12  1996 drivea.xpm
-rw-r--r--   1 mwnurnbe users       2293 Feb  2  1996 exit.xpm
-rw-r--r--   1 mwnurnbe users        893 Feb  2  1996 filebox.xbm
-rw-r--r--   1 mwnurnbe users       2310 Feb  2  1996 filebox.xpm
-rw-r--r--   1 mwnurnbe users        890 Feb  2  1996 harddisk.xbm
-rw-r--r--   1 mwnurnbe users       1371 Feb  2  1996 harddisk.xpm
-rw-r--r--   1 mwnurnbe users        290 Feb  2  1996 italic.xbm
-rw-r--r--   1 mwnurnbe users        293 Feb  2  1996 justify.xbm
-rw-r--r--   1 mwnurnbe users        287 Feb  2  1996 leftj.xbm
-rw-r--r--   1 mwnurnbe users        884 Feb  2  1996 netw.xbm
-rw-r--r--   1 mwnurnbe users       1386 Feb  2  1996 netw.xpm
-rw-r--r--   1 mwnurnbe users        884 May 12  1996 network.xbm
-rw-r--r--   1 mwnurnbe users       1386 May 12  1996 network.xpm
-rw-r--r--   1 mwnurnbe users       2289 Feb  2  1996 optmenu.xpm
-rw-r--r--   1 mwnurnbe users        290 Feb  2  1996 rightj.xbm
-rw-r--r--   1 mwnurnbe users       2356 Feb  2  1996 select.xpm
-rw-r--r--   1 mwnurnbe users      11042 Feb  2  1996 tix.gif
-rw-r--r--   1 mwnurnbe users        299 Feb  2  1996 underlin.xbm

femats/src/Tix4.0.5/demos/c-code:
total 30
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       4877 Apr 23  1996 Makefile.in
drwxr-xr-x   2 mwnurnbe users         24 Nov 27 09:55 library/
-rw-r--r--   1 mwnurnbe users       1041 Apr 23  1996 myCmds.c
-rw-r--r--   1 mwnurnbe users       1246 Apr 23  1996 myInit.c
-rw-r--r--   1 mwnurnbe users       2850 Apr 23  1996 tixAppInit.c

femats/src/Tix4.0.5/demos/c-code/library:
total 4
drwxr-xr-x   2 mwnurnbe users         24 Nov 27 09:55 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:55 ../

femats/src/Tix4.0.5/demos/et:
total 4
drwxr-xr-x   2 mwnurnbe users         24 Nov 27 09:55 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 09:55 ../

femats/src/Tix4.0.5/demos/samples:
total 226
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   6 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       1556 May 16  1996 Balloon.tcl
-rw-r--r--   1 mwnurnbe users       1830 May 16  1996 BtnBox.tcl
-rw-r--r--   1 mwnurnbe users       1801 May 12  1996 CmpImg.tcl
-rw-r--r--   1 mwnurnbe users       5822 May 12  1996 CmpImg1.tcl
-rw-r--r--   1 mwnurnbe users       4354 May 16  1996 CmpImg2.tcl
-rw-r--r--   1 mwnurnbe users       2369 May 18  1996 CmpImg3.tcl
-rw-r--r--   1 mwnurnbe users       3350 May 16  1996 ComboBox.tcl
-rw-r--r--   1 mwnurnbe users       3413 May 16  1996 Control.tcl
-rw-r--r--   1 mwnurnbe users       2588 May 16  1996 DirList.tcl
-rw-r--r--   1 mwnurnbe users       2564 May 16  1996 DirTree.tcl
-rw-r--r--   1 mwnurnbe users       1449 Feb  2  1996 DragDrop.tcl
-rw-r--r--   1 mwnurnbe users       3608 May 12  1996 DynTree.tcl
-rw-r--r--   1 mwnurnbe users       2914 May 12  1996 EFileDlg.tcl
-rw-r--r--   1 mwnurnbe users       2834 May 12  1996 FileDlg.tcl
-rw-r--r--   1 mwnurnbe users       2037 May 16  1996 FileEnt.tcl
-rw-r--r--   1 mwnurnbe users       4457 May 12  1996 HList1.tcl
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-rw-r--r--   1 mwnurnbe users       2597 May 16  1996 LabEntry.tcl
-rw-r--r--   1 mwnurnbe users       2621 May 16  1996 LabFrame.tcl
-rw-r--r--   1 mwnurnbe users       2854 May 16  1996 ListNBK.tcl
-rw-r--r--   1 mwnurnbe users       3439 May 16  1996 NoteBook.tcl
-rw-r--r--   1 mwnurnbe users       2972 May 16  1996 OptMenu.tcl
-rw-r--r--   1 mwnurnbe users       4077 May 16  1996 PanedWin.tcl
-rw-r--r--   1 mwnurnbe users       2198 May 16  1996 PopMenu.tcl
-rw-r--r--   1 mwnurnbe users       2936 May 12  1996 SHList.tcl
-rw-r--r--   1 mwnurnbe users       4938 May 19  1996 SHList2.tcl
-rw-r--r--   1 mwnurnbe users       2759 May 16  1996 SListBox.tcl
-rw-r--r--   1 mwnurnbe users       2379 May 16  1996 SText.tcl
-rw-r--r--   1 mwnurnbe users       2553 May 16  1996 SWindow.tcl
-rw-r--r--   1 mwnurnbe users        868 Feb 17  1996 Sample.tcl
-rw-r--r--   1 mwnurnbe users       3128 May 12  1996 Select.tcl
-rw-r--r--   1 mwnurnbe users       2091 May 16  1996 StdBBox.tcl
-rw-r--r--   1 mwnurnbe users       2491 May 16  1996 Tree.tcl
-rw-r--r--   1 mwnurnbe users       2762 Feb 17  1996 Xpm.tcl
-rw-r--r--   1 mwnurnbe users       3290 May 12  1996 Xpm1.tcl

femats/src/Tix4.0.5/docs:
total 240
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       1618 May 13  1996 Changes.html
-rw-r--r--   1 mwnurnbe users       1455 May 19  1996 Changes.txt
-rw-r--r--   1 mwnurnbe users      15773 May 20  1996 FAQ.html
-rwxr--r--   1 mwnurnbe users      14867 May 19  1996 FAQ.tcl*
-rw-r--r--   1 mwnurnbe users      13304 May 20  1996 FAQ.txt
-rw-r--r--   1 mwnurnbe users       7974 May 19  1996 Install.html
-rw-r--r--   1 mwnurnbe users       6500 May 19  1996 Install.txt
-rw-------   1 mwnurnbe users        577 May 19  1996 Makefile
-rw-------   1 mwnurnbe users       2648 May 19  1996 ManPages.html
-rw-r--r--   1 mwnurnbe users       1904 May 19  1996 Porting.html
-rw-------   1 mwnurnbe users       2572 May 19  1996 Release-4.0.0.html
-rw-r--r--   1 mwnurnbe users       2442 May 19  1996 Release-4.0.0.txt
-rw-------   1 mwnurnbe users       1969 May 19  1996 Release-4.0.1.html
-rw-------   1 mwnurnbe users       1845 May 19  1996 Release-4.0.1.txt
-rw-------   1 mwnurnbe users       4654 May 19  1996 Release-4.0.2.html
-rw-------   1 mwnurnbe users       4277 May 19  1996 Release-4.0.2.txt
-rw-------   1 mwnurnbe users       5516 May 19  1996 Release-4.0.3.html
-rw-------   1 mwnurnbe users       4998 May 19  1996 Release-4.0.3.txt
-rw-------   1 mwnurnbe users       3921 May 19  1996 Release-4.0.4.html
-rw-------   1 mwnurnbe users       3645 May 19  1996 Release-4.0.4.txt
-rw-r--r--   1 mwnurnbe users       2124 May 19  1996 Release-4.0.5.html
-rw-r--r--   1 mwnurnbe users       1973 May 19  1996 Release-4.0.5.txt
-rw-------   1 mwnurnbe users        692 May 19  1996 Release.html
-rw-------   1 mwnurnbe users        504 May 19  1996 Release.txt
-rw-r--r--   1 mwnurnbe users       1734 Jan 31  1996 license.terms.tcltk
-rwxr--r--   1 mwnurnbe users        277 May 19  1996 skipblank.tcl*

femats/src/Tix4.0.5/generic:
total 1302
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users         26 Feb  5  1996 Makefile
-rwxr--r--   1 mwnurnbe users       2182 Jan 31  1996 styopts.tcl*
-rw-r--r--   1 mwnurnbe users      40125 May 10  1996 tixClass.c
-rw-r--r--   1 mwnurnbe users      16269 May  6  1996 tixCmds.c
-rw-r--r--   1 mwnurnbe users        571 Apr  9  1996 tixCompat.c
-rw-r--r--   1 mwnurnbe users      17400 Apr  9  1996 tixDItem.c
-rw-r--r--   1 mwnurnbe users      22737 Apr  9  1996 tixDiITxt.c
-rw-r--r--   1 mwnurnbe users      17541 Apr  9  1996 tixDiImg.c
-rw-r--r--   1 mwnurnbe users      22232 Apr 17  1996 tixDiStyle.c
-rw-r--r--   1 mwnurnbe users      20393 Apr  9  1996 tixDiText.c
-rw-r--r--   1 mwnurnbe users      19658 Apr  9  1996 tixDiWin.c
-rw-r--r--   1 mwnurnbe users       1849 Apr  9  1996 tixError.c
-rw-r--r--   1 mwnurnbe users      55642 Apr 17  1996 tixForm.c
-rw-r--r--   1 mwnurnbe users      15590 Apr  9  1996 tixFormMisc.c
-rw-r--r--   1 mwnurnbe users       8609 May 11  1996 tixGeometry.c
-rw-r--r--   1 mwnurnbe users      11234 Apr  9  1996 tixHLCol.c
-rw-r--r--   1 mwnurnbe users      14941 Apr  9  1996 tixHLHdr.c
-rw-r--r--   1 mwnurnbe users       8315 Apr  9  1996 tixHLInd.c
-rw-r--r--   1 mwnurnbe users     113724 May 17  1996 tixHList.c
-rw-r--r--   1 mwnurnbe users      40083 May 18  1996 tixImgCmp.c
-rw-r--r--   1 mwnurnbe users      39863 Apr 17  1996 tixImgXpm.c
-rw-r--r--   1 mwnurnbe users      11991 May 20  1996 tixInit.c
-rw-r--r--   1 mwnurnbe users      11851 Apr 17  1996 tixInputO.c
-rw-r--r--   1 mwnurnbe users       6273 Apr  9  1996 tixList.c
-rw-r--r--   1 mwnurnbe users      12616 Apr  9  1996 tixMethod.c
-rw-r--r--   1 mwnurnbe users      20452 Apr 17  1996 tixMwm.c
-rw-r--r--   1 mwnurnbe users      42416 Apr  9  1996 tixNBFrame.c
-rw-r--r--   1 mwnurnbe users       9074 Apr  9  1996 tixOption.c
-rw-r--r--   1 mwnurnbe users        440 May 20  1996 tixPatchLevel.h
-rw-r--r--   1 mwnurnbe users       4368 May 11  1996 tixScroll.c
-rw-r--r--   1 mwnurnbe users       2836 Apr  9  1996 tixSmpLs.c
-rw-r--r--   1 mwnurnbe users      19585 May 17  1996 tixUtils.c
-rw-r--r--   1 mwnurnbe users       7491 May  3  1996 tixWidget.c

femats/src/Tix4.0.5/include:
total 112
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users      15382 May 20  1996 tix.h
-rw-r--r--   1 mwnurnbe users       5158 May  5  1996 tixDef.h
-rw-r--r--   1 mwnurnbe users       3612 Feb 19  1996 tixForm.h
-rw-r--r--   1 mwnurnbe users      10182 May 11  1996 tixHList.h
-rw-r--r--   1 mwnurnbe users      18430 May 11  1996 tixInt.h

femats/src/Tix4.0.5/library:
total 736
drwxr-xr-x   4 mwnurnbe users       2048 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users      11497 Apr 21  1996 Balloon.tcl
-rw-r--r--   1 mwnurnbe users       2507 Feb  9  1996 BtnBox.tcl
-rw-r--r--   1 mwnurnbe users      33648 May 17  1996 ComboBox.tcl
-rw-r--r--   1 mwnurnbe users        827 Feb 29  1996 Compat.tcl
-rw-r--r--   1 mwnurnbe users      11541 May 11  1996 Control.tcl
-rw-r--r--   1 mwnurnbe users       2638 Feb 23  1996 DefSchm.tcl
-rw-r--r--   1 mwnurnbe users       4099 Feb  9  1996 DialogS.tcl
-rw-r--r--   1 mwnurnbe users       7053 May  9  1996 DirList.tcl
-rw-r--r--   1 mwnurnbe users       9273 May 17  1996 DirTree.tcl
-rw-r--r--   1 mwnurnbe users       3830 Feb  9  1996 DragDrop.tcl
-rw-r--r--   1 mwnurnbe users      11198 May 12  1996 EFileBox.tcl
-rw-r--r--   1 mwnurnbe users       1406 Feb  9  1996 EFileDlg.tcl
-rw-r--r--   1 mwnurnbe users       4541 May 17  1996 Event.tcl
-rw-r--r--   1 mwnurnbe users      14171 Apr 22  1996 FileBox.tcl
-rw-r--r--   1 mwnurnbe users        886 May 18  1996 FileCmpt.tcl
-rw-r--r--   1 mwnurnbe users       2009 Feb 28  1996 FileDlg.tcl
-rw-r--r--   1 mwnurnbe users       6030 May 17  1996 FileEnt.tcl
-rw-r--r--   1 mwnurnbe users       1507 Feb  9  1996 FileUtil.tcl
-rw-r--r--   1 mwnurnbe users      16093 May 20  1996 HList.tcl
-rw-r--r--   1 mwnurnbe users       4340 May 11  1996 HListDD.tcl
```

```
-rw-r--r--   1 mwnurnbe users       1648 May 19  1996 Init.tcl
-rw-r--r--   1 mwnurnbe users       1798 May 11  1996 LabEntry.tcl
-rw-r--r--   1 mwnurnbe users       1072 Feb  9  1996 LabFrame.tcl
-rw-r--r--   1 mwnurnbe users       3787 Feb  9  1996 LabWidg.tcl
-rw-r--r--   1 mwnurnbe users       2144 Mar  2  1996 ListNBk.tcl
-rw-r--r--   1 mwnurnbe users         61 Jan 31  1996 Makefile
-rw-r--r--   1 mwnurnbe users       5940 May  3  1996 NoteBook.tcl
-rw-r--r--   1 mwnurnbe users       5507 Feb  9  1996 OldUtil.tcl
-rw-r--r--   1 mwnurnbe users       9232 May 11  1996 OptMenu.tcl
-rw-r--r--   1 mwnurnbe users      26939 May 11  1996 PanedWin.tcl
-rw-r--r--   1 mwnurnbe users       4585 May 12  1996 PopMenu.tcl
-rw-r--r--   1 mwnurnbe users      10440 May 10  1996 Primitiv.tcl
-rw-r--r--   1 mwnurnbe users      12742 May 17  1996 ResizeH.tcl
-rw-r--r--   1 mwnurnbe users       3208 May  6  1996 SHList.tcl
-rw-r--r--   1 mwnurnbe users       7049 May 17  1996 SListBox.tcl
-rw-r--r--   1 mwnurnbe users       3105 Feb 11  1996 SText.tcl
-rw-r--r--   1 mwnurnbe users       9928 May 17  1996 SWidget.tcl
-rw-r--r--   1 mwnurnbe users       6806 May 17  1996 SWindow.tcl
-rw-r--r--   1 mwnurnbe users       7022 May 11  1996 Select.tcl
-rw-r--r--   1 mwnurnbe users        888 Feb  9  1996 Shell.tcl
-rw-r--r--   1 mwnurnbe users        944 May 10  1996 SimpDlg.tcl
-rw-r--r--   1 mwnurnbe users       1776 Mar  2  1996 StackWin.tcl
-rw-r--r--   1 mwnurnbe users       1165 Feb  9  1996 StatBar.tcl
-rw-r--r--   1 mwnurnbe users       1483 Feb  9  1996 StdBBox.tcl
-rw-r--r--   1 mwnurnbe users        999 Feb  9  1996 StdShell.tcl
-rw-r--r--   1 mwnurnbe users      11259 May 18  1996 Tix.tcl
-rw-r--r--   1 mwnurnbe users       4165 May 17  1996 Tree.tcl
-rw-r--r--   1 mwnurnbe users       3822 May 18  1996 UnixFile.tcl
-rw-r--r--   1 mwnurnbe users      11035 Apr  6  1996 Utils.tcl
-rw-r--r--   1 mwnurnbe users       4841 May 10  1996 VResize.tcl
-rw-r--r--   1 mwnurnbe users       8848 May 10  1996 VStack.tcl
-rw-r--r--   1 mwnurnbe users       4473 May 17  1996 VTree.tcl
-rw-r--r--   1 mwnurnbe users       2383 Feb  9  1996 Variable.tcl
-rw-r--r--   1 mwnurnbe users        312 Apr  6  1996 Verify.tcl
-rw-r--r--   1 mwnurnbe users        375 May 20  1996 Version.tcl
-rw-r--r--   1 mwnurnbe users        792 Feb  9  1996 WInfo.tcl
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:55 bitmaps/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 pref/
-rw-r--r--   1 mwnurnbe users      11271 May 20  1996 tclIndex

femats/src/Tix4.0.5/library/bitmaps:
total 132
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:55 ./
drwxr-xr-x   4 mwnurnbe users       2048 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users         90 Mar 31  1996 act_fold.gif
-rw-r--r--   1 mwnurnbe users        221 Apr 21  1996 act_fold.xbm
-rw-r--r--   1 mwnurnbe users        436 Apr 21  1996 act_fold.xpm
-rwxr--r--   1 mwnurnbe users        123 Apr 21  1996 balarrow.xbm*
-rwxr--r--   1 mwnurnbe users        263 Mar 31  1996 cbxarrow.xbm*
-rw-r--r--   1 mwnurnbe users        254 Mar 31  1996 ck_def.xbm
-rw-r--r--   1 mwnurnbe users        254 Mar 31  1996 ck_off.xbm
-rw-r--r--   1 mwnurnbe users        251 Mar 31  1996 ck_on.xbm
-rwxr--r--   1 mwnurnbe users        254 Mar 31  1996 cross.xbm*
-rwxr--r--   1 mwnurnbe users         99 Mar 31  1996 decr.xbm*
-rw-r--r--   1 mwnurnbe users        326 Mar 31  1996 drop.xbm
-rw-r--r--   1 mwnurnbe users         76 Mar 31  1996 file.gif
-rw-r--r--   1 mwnurnbe users        233 Mar 31  1996 file.xbm
-rw-r--r--   1 mwnurnbe users        298 Mar 31  1996 file.xpm
-rw-r--r--   1 mwnurnbe users         79 Mar 31  1996 folder.gif
-rw-r--r--   1 mwnurnbe users        215 Mar 31  1996 folder.xbm
-rw-r--r--   1 mwnurnbe users        418 Mar 31  1996 folder.xpm
-rwxr--r--   1 mwnurnbe users        896 May 17  1996 harddisk.xbm*
-rw-r--r--   1 mwnurnbe users        969 Mar 31  1996 hourglas.mask
-rwxr--r--   1 mwnurnbe users        940 Apr 21  1996 hourglas.xbm*
-rwxr--r--   1 mwnurnbe users         99 Mar 31  1996 incr.xbm*
-rw-r--r--   1 mwnurnbe users        159 Mar 31  1996 info.gif
-rw-r--r--   1 mwnurnbe users       1258 Mar 31  1996 info.xpm
-rw-r--r--   1 mwnurnbe users        284 Mar 31  1996 maximize.xbm
-rw-r--r--   1 mwnurnbe users        284 Mar 31  1996 minimize.xbm
-rw-r--r--   1 mwnurnbe users         57 Mar 31  1996 minus.gif
-rw-r--r--   1 mwnurnbe users        198 Mar 31  1996 minus.xbm
-rw-r--r--   1 mwnurnbe users        201 Mar 31  1996 minus.xpm
-rw-r--r--   1 mwnurnbe users         59 Mar 31  1996 minusarm.gif
-rw-r--r--   1 mwnurnbe users        207 Mar 31  1996 minusarm.xbm
-rw-r--r--   1 mwnurnbe users        220 Mar 31  1996 minusarm.xpm
-rw-r--r--   1 mwnurnbe users        176 Mar 31  1996 mktransgif.tcl
-rwxr--r--   1 mwnurnbe users        893 May 17  1996 network.xbm*
-rw-r--r--   1 mwnurnbe users        176 Mar 31  1996 no_entry.gif
-rw-r--r--   1 mwnurnbe users       1274 Mar 31  1996 no_entry.xpm
-rw-r--r--   1 mwnurnbe users        221 Mar 31  1996 openfile.xbm
-rw-r--r--   1 mwnurnbe users         84 Mar 31  1996 openfold.gif
-rw-r--r--   1 mwnurnbe users        221 Apr 21  1996 openfold.xbm
-rw-r--r--   1 mwnurnbe users        418 Apr 21  1996 openfold.xpm
-rw-r--r--   1 mwnurnbe users         58 Mar 31  1996 plus.gif
-rw-r--r--   1 mwnurnbe users        195 Mar 31  1996 plus.xbm
-rw-r--r--   1 mwnurnbe users        200 Mar 31  1996 plus.xpm
-rw-r--r--   1 mwnurnbe users         60 Mar 31  1996 plusarm.gif
-rw-r--r--   1 mwnurnbe users        204 Mar 31  1996 plusarm.xbm
-rw-r--r--   1 mwnurnbe users        212 Mar 31  1996 plusarm.xpm
-rw-r--r--   1 mwnurnbe users        305 Mar 31  1996 resize1.xbm
-rw-r--r--   1 mwnurnbe users        305 Mar 31  1996 resize2.xbm
-rw-r--r--   1 mwnurnbe users        281 Mar 31  1996 restore.xbm
-rw-r--r--   1 mwnurnbe users         79 Mar 31  1996 srcfile.gif
-rw-r--r--   1 mwnurnbe users        242 Mar 31  1996 srcfile.xbm
-rw-r--r--   1 mwnurnbe users        294 Mar 31  1996 srcfile.xpm
-rw-r--r--   1 mwnurnbe users        278 Mar 31  1996 system.xbm
-rw-r--r--   1 mwnurnbe users         79 Mar 31  1996 textfile.gif
-rw-r--r--   1 mwnurnbe users        245 Mar 31  1996 textfile.xbm
-rw-r--r--   1 mwnurnbe users        302 Mar 31  1996 textfile.xpm
-rw-r--r--   1 mwnurnbe users        251 Mar 31  1996 tick
-rwxr--r--   1 mwnurnbe users        251 Mar 31  1996 tick.xbm*
-rw-r--r--   1 mwnurnbe users        180 Mar 31  1996 warning.gif
-rw-r--r--   1 mwnurnbe users       1262 Mar 31  1996 warning.xpm

femats/src/Tix4.0.5/library/pref:
total 294
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   4 mwnurnbe users       2048 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users        468 Apr 21  1996 12Point.fs
-rw-r--r--   1 mwnurnbe users       1872 May  6  1996 12Point.fsc
-rw-r--r--   1 mwnurnbe users        434 Apr 21  1996 14Point.fs
-rw-r--r--   1 mwnurnbe users       1839 May  6  1996 14Point.fsc
-rw-r--r--   1 mwnurnbe users        960 Feb 23  1996 Bisque.cs
-rw-r--r--   1 mwnurnbe users      22556 May  6  1996 Bisque.csc
-rw-r--r--   1 mwnurnbe users        979 Jan 31  1996 Blue.cs
-rw-r--r--   1 mwnurnbe users      22571 May  6  1996 Blue.csc
-rw-r--r--   1 mwnurnbe users        979 Jan 31  1996 Gray.cs
-rw-r--r--   1 mwnurnbe users      22571 May  6  1996 Gray.csc
-rw-r--r--   1 mwnurnbe users        754 Feb 23  1996 Makefile
-rw-r--r--   1 mwnurnbe users        476 Feb 23  1996 Old12Pt.fs
-rw-r--r--   1 mwnurnbe users        434 Feb 23  1996 Old14Pt.fs
-rw-r--r--   1 mwnurnbe users        957 Jan 31  1996 SGIGray.cs
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-rw-r--r--   1 mwnurnbe users      22553 May  6  1996 SGIGray.csc
-rw-r--r--   1 mwnurnbe users        960 Feb 23  1996 TK.cs
-rw-r--r--   1 mwnurnbe users       1958 May  6  1996 TK.csc
-rw-r--r--   1 mwnurnbe users        446 Apr 21  1996 TK.fs
-rw-r--r--   1 mwnurnbe users        508 May  6  1996 TK.fsc
-rw-r--r--   1 mwnurnbe users        957 Jan 31  1996 TixGray.cs
-rw-r--r--   1 mwnurnbe users      22555 May  6  1996 TixGray.csc
-rwxr--r--   1 mwnurnbe users       9658 May  6  1996 tixmkpref*

femats/src/Tix4.0.5/man:
total 1330
drwxr-xr-x   3 mwnurnbe users       2048 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       6354 May 13  1996 Balloon.html
-rw-r--r--   1 mwnurnbe users       7140 May  4  1996 Balloon.n
-rw-r--r--   1 mwnurnbe users       5250 May 13  1996 BtnBox.html
-rw-r--r--   1 mwnurnbe users       5974 May  4  1996 BtnBox.n
-rw-r--r--   1 mwnurnbe users      15630 May 13  1996 ComboBox.html
-rw-r--r--   1 mwnurnbe users      15374 May  4  1996 ComboBox.n
-rw-r--r--   1 mwnurnbe users      12059 May 13  1996 Control.html
-rw-r--r--   1 mwnurnbe users      12158 May  4  1996 Control.n
-rw-r--r--   1 mwnurnbe users      14341 May 13  1996 DItem.html
-rw-r--r--   1 mwnurnbe users      14384 May  4  1996 DItem.n
-rw-r--r--   1 mwnurnbe users        556 May 13  1996 Destroy.html
-rw-r--r--   1 mwnurnbe users        887 May  4  1996 Destroy.n
-rw-r--r--   1 mwnurnbe users       7381 May 13  1996 DirList.html
-rw-r--r--   1 mwnurnbe users       7965 May  4  1996 DirList.n
-rw-r--r--   1 mwnurnbe users       6781 May 13  1996 DirTree.html
-rw-r--r--   1 mwnurnbe users       7437 May  4  1996 DirTree.n
-rw-r--r--   1 mwnurnbe users       9334 May 13  1996 EFileBox.html
-rw-r--r--   1 mwnurnbe users       9727 May  4  1996 EFileBox.n
-rw-r--r--   1 mwnurnbe users       4054 May 13  1996 EFileDlg.html
-rw-r--r--   1 mwnurnbe users       4989 May  4  1996 EFileDlg.n
-rw-r--r--   1 mwnurnbe users       7433 May 13  1996 FileBox.html
-rw-r--r--   1 mwnurnbe users       7318 May  4  1996 FileBox.n
-rw-r--r--   1 mwnurnbe users       4231 May 13  1996 FileDlg.html
-rw-r--r--   1 mwnurnbe users       5135 May  4  1996 FileDlg.n
-rw-r--r--   1 mwnurnbe users       9214 May 13  1996 FileEnt.html
-rw-r--r--   1 mwnurnbe users       9627 May  4  1996 FileEnt.n
-rw-r--r--   1 mwnurnbe users      15597 May 13  1996 Form.html
-rw-r--r--   1 mwnurnbe users      14396 May  4  1996 Form.n
-rw-r--r--   1 mwnurnbe users        733 May 13  1996 GetBool.html
-rw-r--r--   1 mwnurnbe users       1146 May  4  1996 GetBool.n
-rw-r--r--   1 mwnurnbe users        764 May 13  1996 GetInt.html
-rw-r--r--   1 mwnurnbe users       1172 May  4  1996 GetInt.n
-rw-r--r--   1 mwnurnbe users      41016 May 20  1996 HList.html
-rw-r--r--   1 mwnurnbe users      38299 May 13  1996 HList.n
-rw-r--r--   1 mwnurnbe users       3058 May 13  1996 InpOnly.html
-rw-r--r--   1 mwnurnbe users       3921 May  4  1996 InpOnly.n
-rw-r--r--   1 mwnurnbe users       4762 May 13  1996 LabEntry.html
-rw-r--r--   1 mwnurnbe users       5591 May  4  1996 LabEntry.n
-rw-r--r--   1 mwnurnbe users       5309 May 13  1996 LabFrame.html
-rw-r--r--   1 mwnurnbe users       6015 May  4  1996 LabFrame.n
-rw-r--r--   1 mwnurnbe users       7709 May 13  1996 ListNBK.html
-rw-r--r--   1 mwnurnbe users       8287 May  4  1996 ListNBK.n
-rw-r--r--   1 mwnurnbe users       1875 May 19  1996 Makefile
-rw-r--r--   1 mwnurnbe users       3011 May 13  1996 Mwm.html
-rw-r--r--   1 mwnurnbe users       3320 May  4  1996 Mwm.n
-rw-r--r--   1 mwnurnbe users       2808 May 13  1996 NBFrame.html
-rw-r--r--   1 mwnurnbe users       3516 May  4  1996 NBFrame.n
-rw-r--r--   1 mwnurnbe users       9606 May 13  1996 NoteBook.html
-rw-r--r--   1 mwnurnbe users      10130 May  4  1996 NoteBook.n
-rw-r--r--   1 mwnurnbe users       8338 May 13  1996 OptMenu.html
-rw-r--r--   1 mwnurnbe users       8671 May  4  1996 OptMenu.n
-rw-r--r--   1 mwnurnbe users      10761 May 13  1996 PanedWin.html
-rw-r--r--   1 mwnurnbe users      10997 May  8  1996 PanedWin.n
-rw-r--r--   1 mwnurnbe users       6514 May 13  1996 PopMenu.html
-rw-r--r--   1 mwnurnbe users       7339 May 12  1996 PopMenu.n
-rw-r--r--   1 mwnurnbe users        144 Jan 31  1996 README
-rw-r--r--   1 mwnurnbe users       4987 May 13  1996 SHList.html
-rw-r--r--   1 mwnurnbe users       5523 May  4  1996 SHList.n
-rw-r--r--   1 mwnurnbe users       6886 May 20  1996 SListBox.html
-rw-r--r--   1 mwnurnbe users       7342 May 17  1996 SListBox.n
-rw-r--r--   1 mwnurnbe users       4968 May 13  1996 SText.html
-rw-r--r--   1 mwnurnbe users       5503 May  4  1996 SText.n
-rw-r--r--   1 mwnurnbe users       6588 May 13  1996 SWindow.html
-rw-r--r--   1 mwnurnbe users       6950 May  4  1996 SWindow.n
-rw-r--r--   1 mwnurnbe users      10417 May 13  1996 Select.html
-rw-r--r--   1 mwnurnbe users      10718 May  4  1996 Select.n
-rw-r--r--   1 mwnurnbe users       5260 May 13  1996 StdBBox.html
-rw-r--r--   1 mwnurnbe users       5952 May  4  1996 StdBBox.n
-rw-r--r--   1 mwnurnbe users       1577 May 13  1996 TixIntro.html
-rw-r--r--   1 mwnurnbe users       1855 May  4  1996 TixIntro.n
-rw-r--r--   1 mwnurnbe users       8954 May 13  1996 Tree.html
-rw-r--r--   1 mwnurnbe users       9404 May  4  1996 Tree.n
-rw-r--r--   1 mwnurnbe users       2072 May 13  1996 Utils.html
-rw-r--r--   1 mwnurnbe users       2142 May  4  1996 Utils.n
-rw-r--r--   1 mwnurnbe users       1497 May 13  1996 Wm.html
-rw-r--r--   1 mwnurnbe users       1768 May  4  1996 Wm.n
-rwxr-xr-x   1 mwnurnbe users        196 May  8  1996 check.tcl*
-rwxr-xr-x   1 mwnurnbe users        173 May 19  1996 checkhtml.tcl*
-rw-r--r--   1 mwnurnbe users      10764 May 13  1996 compound.html
-rw-r--r--   1 mwnurnbe users      10058 May  4  1996 compound.n
-rw-r--r--   1 mwnurnbe users        493 May  4  1996 copyright.txt
-rw-r--r--   1 mwnurnbe users       4197 Mar  3  1996 man.macros
-rw-r--r--   1 mwnurnbe users       3132 May 13  1996 pixmap.html
-rw-r--r--   1 mwnurnbe users       3236 May  4  1996 pixmap.n
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 prolog/
-rw-r--r--   1 mwnurnbe users       8702 May 13  1996 tix.html
-rw-r--r--   1 mwnurnbe users       8190 May  4  1996 tix.n
-rw-r--r--   1 mwnurnbe users       6770 May  4  1996 tixwish.1
-rw-r--r--   1 mwnurnbe users       6451 May 13  1996 tixwish.html

femats/src/Tix4.0.5/man/prolog:
total 72
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   3 mwnurnbe users       2048 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users      31245 Jan 31  1996 prolog.ps
-rw-r--r--   1 mwnurnbe users       1272 Jan 31  1996 prolog.tex

femats/src/Tix4.0.5/test:
total 42
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       2866 May 19  1996 APITest.tcl
-rw-r--r--   1 mwnurnbe users       2727 May 19  1996 Driver.tcl
-rw-r--r--   1 mwnurnbe users       1925 Nov 27 09:55 Makefile
-rw-r--r--   1 mwnurnbe users       1915 Mar  5  1996 Makefile.in
-rwxr--r--   1 mwnurnbe users       1128 May 19  1996 Test.tcl*
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 general/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 hlist/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 itcl/
```

```
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 library/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 load/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 tlist/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 xpm/

femats/src/Tix4.0.5/test/general:
total 38
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       2014 May 20  1996 event0.tcl
-rw-r--r--   1 mwnurnbe users        573 Apr  6  1996 file.tcl
-rw-r--r--   1 mwnurnbe users         64 Apr 21  1996 files
-rw-r--r--   1 mwnurnbe users        279 Feb 23  1996 oop.tcl
-rw-r--r--   1 mwnurnbe users        629 Apr  2  1996 options.tcl
-rw-r--r--   1 mwnurnbe users       2743 Apr 21  1996 optmenu.tcl
-rw-r--r--   1 mwnurnbe users        116 Feb  2  1996 pkginit.tcl
-rw-r--r--   1 mwnurnbe users       1390 Mar  2  1996 select.tcl
-rw-r--r--   1 mwnurnbe users        326 Feb 29  1996 slistbox.tcl
-rwxr--r--   1 mwnurnbe users        172 Feb 23  1996 test-tmp.tcl*
-rw-r--r--   1 mwnurnbe users        172 Feb 23  1996 testtmpl.tcl
-rw-r--r--   1 mwnurnbe users       1152 Feb 23  1996 var1.tcl

femats/src/Tix4.0.5/test/hlist:
total 16
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       2070 Feb  2  1996 HLHdr.tcl
-rw-r--r--   1 mwnurnbe users       1567 Feb  5  1996 HLInd.tcl
-rw-r--r--   1 mwnurnbe users         10 Feb  2  1996 files

femats/src/Tix4.0.5/test/itcl:
total 18
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users         43 Feb 15  1996 files
-rw-r--r--   1 mwnurnbe users        214 Feb 23  1996 general.tcl
-rw-r--r--   1 mwnurnbe users        643 Feb 23  1996 itk.tcl
-rw-r--r--   1 mwnurnbe users        414 Feb 23  1996 namesp.tcl
-rw-r--r--   1 mwnurnbe users        175 Feb 23  1996 pkginit.tcl
-rw-r--r--   1 mwnurnbe users       1095 Feb 23  1996 scope1.tcl

femats/src/Tix4.0.5/test/library:
total 20
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       6375 Apr 22  1996 TestLib.tcl
-rw-r--r--   1 mwnurnbe users        118 Feb  9  1996 load-init.tcl

femats/src/Tix4.0.5/test/load:
total 8
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users         12 Feb  9  1996 files
-rw-r--r--   1 mwnurnbe users        320 Apr 23  1996 general.tcl
-rw-r--r--   1 mwnurnbe users          0 Feb  9  1996 pkginit.tcl

femats/src/Tix4.0.5/test/tlist:
total 6
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users        894 Feb  2  1996 TList.tcl

femats/src/Tix4.0.5/test/xpm:
total 38
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   9 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users        148 Feb  2  1996 2cpp.xpm
-rw-r--r--   1 mwnurnbe users       3763 Mar  1  1996 Xpm.tcl
-rw-r--r--   1 mwnurnbe users        350 Mar  1  1996 brace.xpm
-rw-r--r--   1 mwnurnbe users        476 Mar  1  1996 comments.xpm
-rw-r--r--   1 mwnurnbe users       1042 Mar  1  1996 compound.tcl
-rw-r--r--   1 mwnurnbe users        412 Feb  2  1996 f-badcol.xpm
-rw-r--r--   1 mwnurnbe users        414 Feb  2  1996 f-badpix.xpm
-rw-r--r--   1 mwnurnbe users        441 Feb  2  1996 f-commt.xpm
-rw-r--r--   1 mwnurnbe users        372 Feb  2  1996 f-missline.xpm
-rw-r--r--   1 mwnurnbe users        414 Feb  2  1996 f-ok.xpm
-rw-r--r--   1 mwnurnbe users        374 Feb  2  1996 f-shortln.xpm
-rw-r--r--   1 mwnurnbe users         20 Mar  1  1996 files
-rw-r--r--   1 mwnurnbe users        414 Feb  2  1996 folder.xpm

femats/src/Tix4.0.5/tools:
total 30
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       1034 Jan 31  1996 README.html
-rwxr-xr-x   1 mwnurnbe users        823 Jan 31  1996 color.tcl*
-rwxr-xr-x   1 mwnurnbe users        701 May 16  1996 dosstrip.tcl*
-rwxr-xr-x   1 mwnurnbe users       1336 Feb  9  1996 hanno.tcl*
-rwxr-xr-x   1 mwnurnbe users        462 Jan 31  1996 icon.tcl*
-rwxr-xr-x   1 mwnurnbe users        108 Jan 31  1996 mkfaq.tcl*
-rwxr-xr-x   1 mwnurnbe users        387 Jan 31  1996 tcltrim*
-rwxr-xr-x   1 mwnurnbe users       2009 May 16  1996 tixindex*
-rwxr-xr-x   1 mwnurnbe users       1318 May  4  1996 tixverify.tcl*

femats/src/Tix4.0.5/unix-et-tk4.0:
total 154
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users       4728 Jun 19  1996 Makefile.in
-rw-r--r--   1 mwnurnbe users      36645 Jan 31  1996 et2c.c
-rw-r--r--   1 mwnurnbe users      26234 Jan 31  1996 et40.et
-rw-r--r--   1 mwnurnbe users       1022 Apr 21  1996 etixAppInit.et
-rw-r--r--   1 mwnurnbe users        500 May 12  1996 etixInit.et.dist
-rwxr--r--   1 mwnurnbe users       1762 May  6  1996 makebitmap.tcl*
-rwxr-xr-x   1 mwnurnbe users       2734 May 18  1996 makescript.tcl*
-rw-r--r--   1 mwnurnbe users         92 May 12  1996 test.tcl

femats/src/Tix4.0.5/unix-itcl2.0:
total 276
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users      10880 Jun 19  1996 Makefile.in
-rw-r--r--   1 mwnurnbe users     109727 Jan 31  1996 itcl_namesp.c
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 test/
-rw-r--r--   1 mwnurnbe users       3118 Mar  3  1996 tixAppInit.c

femats/src/Tix4.0.5/unix-itcl2.0/test:
total 20
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:55 ../
-rwxr--r--   1 mwnurnbe users       7527 Jan 31  1996 itkedit*
```

```
femats/src/Tix4.0.5/unix-tk4.0:
total 32
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:55 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users      10210 Jun 19  1996 Makefile.in
-rw-r--r--   1 mwnurnbe users       3256 Mar  3  1996 tixAppInit.c

femats/src/Tix4.0.5/unix-tk4.1:
total 3636
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:58 ./
drwxr-xr-x  14 mwnurnbe users       1024 Nov 27 09:55 ../
-rw-r--r--   1 mwnurnbe users      17856 Nov 27 09:55 Makefile
-rw-r--r--   1 mwnurnbe users      17683 Jun 19  1996 Makefile.in
-rw-r--r--   1 mwnurnbe users     290916 Nov 27 09:58 libtix.a
-rw-r--r--   1 mwnurnbe users       3256 Mar  3  1996 tixAppInit.c
-rw-r--r--   1 mwnurnbe users       1304 Nov 27 09:58 tixAppInit.o
-rw-r--r--   1 mwnurnbe users      13980 Nov 27 09:56 tixClass.o
-rw-r--r--   1 mwnurnbe users      10112 Nov 27 09:56 tixCmds.o
-rw-r--r--   1 mwnurnbe users        348 Nov 27 09:56 tixCompat.o
-rw-r--r--   1 mwnurnbe users       7264 Nov 27 09:56 tixDItem.o
-rw-r--r--   1 mwnurnbe users      10636 Nov 27 09:56 tixDiITxt.o
-rw-r--r--   1 mwnurnbe users       8412 Nov 27 09:56 tixDiImg.o
-rw-r--r--   1 mwnurnbe users      10536 Nov 27 09:57 tixDiStyle.o
-rw-r--r--   1 mwnurnbe users       8760 Nov 27 09:57 tixDiText.o
-rw-r--r--   1 mwnurnbe users       9180 Nov 27 09:57 tixDiWin.o
-rw-r--r--   1 mwnurnbe users       1636 Nov 27 09:56 tixError.o
-rw-r--r--   1 mwnurnbe users      22148 Nov 27 09:57 tixForm.o
-rw-r--r--   1 mwnurnbe users       7924 Nov 27 09:57 tixFormMisc.o
-rw-r--r--   1 mwnurnbe users       5620 Nov 27 09:56 tixGeometry.o
-rw-r--r--   1 mwnurnbe users       6232 Nov 27 09:57 tixHLCol.o
-rw-r--r--   1 mwnurnbe users       7656 Nov 27 09:58 tixHLHdr.o
-rw-r--r--   1 mwnurnbe users       4360 Nov 27 09:58 tixHLInd.o
-rw-r--r--   1 mwnurnbe users      42764 Nov 27 09:57 tixHList.o
-rw-r--r--   1 mwnurnbe users      14224 Nov 27 09:57 tixImgCmp.o
-rw-r--r--   1 mwnurnbe users      13060 Nov 27 09:57 tixImgXpm.o
-rw-r--r--   1 mwnurnbe users       7292 Nov 27 09:56 tixInit.o
-rw-r--r--   1 mwnurnbe users       4716 Nov 27 09:58 tixInputO.o
-rw-r--r--   1 mwnurnbe users       3600 Nov 27 09:56 tixList.o
-rw-r--r--   1 mwnurnbe users       7212 Nov 27 09:56 tixMethod.o
-rw-r--r--   1 mwnurnbe users       9704 Nov 27 09:57 tixMwm.o
-rw-r--r--   1 mwnurnbe users      16436 Nov 27 09:58 tixNBFrame.o
-rw-r--r--   1 mwnurnbe users       4908 Nov 27 09:56 tixOption.o
-rw-r--r--   1 mwnurnbe users       2812 Nov 27 09:56 tixScroll.o
-rw-r--r--   1 mwnurnbe users       3216 Nov 27 09:56 tixSmpLs.o
-rw-r--r--   1 mwnurnbe users       9068 Nov 27 09:56 tixUtils.o
-rw-r--r--   1 mwnurnbe users       4016 Nov 27 09:56 tixWidget.o
-rwxr-xr-x   1 mwnurnbe users    1208320 Nov 27 09:58 tixwish*

femats/src/archive:
total 72564
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:03 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users       6184 Oct 21 11:55 Tix4.0.5.README
-rw-r--r--   1 mwnurnbe users    2955264 Oct 21 11:55 Tix4.0.5.tar
-rw-r--r--   1 mwnurnbe users     273360 Oct 21 11:58 TixManPages4.0.5.ps.Z
-rw-r--r--   1 mwnurnbe users      12253 Oct 21 11:58 TixManTitle4.0.5.ps.Z
-rw-r--r--   1 mwnurnbe users       3689 Oct 21 11:48 bbfig.tar.Z
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:41 extras/
-rw-r--r--   1 mwnurnbe users     765669 Oct 21 11:53 geomview-1.5.0-patch1.tar.Z
-rw-r--r--   1 mwnurnbe users    8907776 Oct 21 11:50 geomview-hp.tar
-rw-r--r--   1 mwnurnbe users    8112669 Oct 21 11:51 geomview-opengl-irix5.tar.Z
-rw-r--r--   1 mwnurnbe users     235520 Nov  6 14:58 prism.tar
-rw-r--r--   1 mwnurnbe users    3912704 Oct 21 11:56 tcl7.5.tar
-rw-r--r--   1 mwnurnbe users    7128064 Oct 21 11:56 tk4.1.tar
-rw-r--r--   1 mwnurnbe users    4726784 Oct 21 11:48 xmgr-3.01pl7.tar

femats/src/archive/extras:
total 36
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:41 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 10:03 ../
-rwxr-xr-x   1 mwnurnbe users        585 Oct 26 14:27 build_Geomview1.5*
-rwxr-xr-x   1 mwnurnbe users        516 Nov  4 15:14 fix_gui_interp*
-rwxr-xr-x   1 mwnurnbe users        301 Nov  4 10:04 fix_man_pages*
-rw-r--r--   1 mwnurnbe users      12694 Nov 27 09:35 xmgr-3.01pl7_Makefile

femats/src/gui:
total 316
drwxr-xr-x   2 mwnurnbe users       1024 Feb 24 17:33 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users        212 Oct 28 10:05 default.prism.i
-rw-r--r--   1 mwnurnbe users       5539 Oct 30 13:23 default.prj
-rw-r--r--   1 mwnurnbe users       2088 Nov  4 15:12 init.orig
-rwxr-xr-x   1 mwnurnbe users       2109 Nov 27 10:04 init.tcl*
-rwxr-xr-x   1 mwnurnbe users       7289 Dec  9 15:36 main_menu.tcl*
-rwxr-xr-x   1 mwnurnbe users       7289 Dec  9 15:36 main_menu.tcl.bak*
-rwxr-xr-x   1 mwnurnbe users        571 Nov  2 14:03 meshing.tcl*
-rwxr-xr-x   1 mwnurnbe users        489 Nov  4 15:27 meshing_prism.csh*
-rwxr-xr-x   1 mwnurnbe users      10528 Nov  7 11:36 postproc.tcl*
-rwxr-xr-x   1 mwnurnbe users      53590 Nov  4 18:46 preproc.tcl*
-rwxr-xr-x   1 mwnurnbe users       1734 Nov  7 10:00 preproc_pppipe.tcl*
-rwxr-xr-x   1 mwnurnbe users       6279 Nov  4 18:46 preproc_ppscript.csh*
-rwxr-xr-x   1 mwnurnbe users      11288 Oct 31 14:00 project.tcl*
-rwxr-xr-x   1 mwnurnbe users      27435 Nov 27 09:42 run.tcl*
-rwxr-xr-x   1 mwnurnbe users       3501 Nov  7 10:00 run_solverpipe.tcl*
-rw-r--r--   1 mwnurnbe users       5688 Feb 22 11:55 tclIndex
-rwxr-xr-x   1 mwnurnbe users       2108 Nov  1 10:38 test.tcl*

femats/src/postproc:
total 102
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:06 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users        546 Nov  2 15:15 Makefile
-rwxr--r--   1 mwnurnbe users        480 Nov  2 15:19 fem_data.h*
-rwxr-xr-x   1 mwnurnbe users      32768 Nov 27 10:06 post*
-rw-r--r--   1 mwnurnbe users       4155 Oct 25 17:31 post.f
-rw-r--r--   1 mwnurnbe users       9620 Nov 27 10:06 post.o

femats/src/preproc:
total 756
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:15 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users        492 Nov  2 15:12 Makefile
-rwxr-xr-x   1 mwnurnbe users      45056 Nov 27 10:04 c2p*
-rw-r--r--   1 mwnurnbe users      20641 Nov 23 16:19 c2p.f
-rw-r--r--   1 mwnurnbe users      23404 Nov 27 10:04 c2p.o
-rwxr-xr-x   1 mwnurnbe users      49152 Nov 27 10:05 c2p_2d*
-rw-r--r--   1 mwnurnbe users      23847 Oct 25 17:14 c2p_2d.f
-rw-r--r--   1 mwnurnbe users      27552 Nov 27 10:05 c2p_2d.o
-rwxr-xr-x   1 mwnurnbe users      24576 Nov 27 10:16 count*
-rw-r--r--   1 mwnurnbe users       3735 Nov 27 10:15 count.f
-rw-r--r--   1 mwnurnbe users       3734 Nov 27 10:15 count.f.bak
-rw-r--r--   1 mwnurnbe users       5028 Nov 27 10:16 count.o
```

```
-rw-r--r--   1 mwnurnbe users       413 Oct 25 17:18 parmvl
-rwxr-xr-x   1 mwnurnbe users     40960 Nov 27 10:05 prompt*
-rw-r--r--   1 mwnurnbe users      9105 Oct 25 17:14 prompt.f
-rw-r--r--   1 mwnurnbe users     19740 Nov 27 10:05 prompt.o
-rwxr-xr-x   1 mwnurnbe users     45056 Nov 27 10:04 u2c*
-rw-r--r--   1 mwnurnbe users     14303 Oct 25 17:14 u2c.f
-rw-r--r--   1 mwnurnbe users     22560 Nov 27 10:04 u2c.o

femats/src/prism:
total 24
drwxr-xr-x   4 mwnurnbe users      1024 Nov 27 10:03 ./
drwxr-xr-x  13 mwnurnbe users      1024 Nov 27 10:03 ../
-rw-r-----   1 mwnurnbe users      6348 Oct 29 11:58 README
drwxr-xr-x   2 mwnurnbe users      1024 Nov 27 10:04 bin/
drwxr-xr-x   2 mwnurnbe users      2048 Feb 21 14:12 src/

femats/src/prism/bin:
total 226
drwxr-xr-x   2 mwnurnbe users      1024 Nov 27 10:04 ./
drwxr-xr-x   4 mwnurnbe users      1024 Nov 27 10:03 ../
-rwxr-xr-x   1 mwnurnbe users     98304 Nov 27 10:04 prism*
-rw-r-----   1 mwnurnbe users      2536 Oct 29 11:58 prism.i
-rw-r--r--   1 mwnurnbe users       213 Nov  2 14:27 prism.i.orig
-rwxr-xr-x   1 mwnurnbe users     10854 Nov  2 13:55 prism_gui*

femats/src/prism/src:
total 708
drwxr-xr-x   2 mwnurnbe users      2048 Feb 21 14:12 ./
drwxr-xr-x   4 mwnurnbe users      1024 Nov 27 10:03 ../
-rw-r-----   1 mwnurnbe users      4972 Nov  6 14:58 Makefile
-rw-r-----   1 mwnurnbe users      4403 Oct 29 11:58 Makefile.orig
-rwxr-xr-x   1 mwnurnbe users     20480 Nov 27 10:04 ac2pr*
-rw-r--r--   1 mwnurnbe users       563 Oct 30 14:22 ac2pr.f
-rw-r--r--   1 mwnurnbe users      3060 Nov 27 10:04 ac2pr.o
-rw-r-----   1 mwnurnbe users      2166 Oct 29 11:58 alfa.F
-rw-r--r--   1 mwnurnbe users      2176 Nov 27 10:03 alfa.o
-rw-r-----   1 mwnurnbe users      1962 Oct 29 11:58 alpha.F
-rw-r--r--   1 mwnurnbe users      1068 Nov 27 10:03 alpha.o
-rw-r-----   1 mwnurnbe users      2329 Oct 29 11:58 aver_el.F
-rw-r--r--   1 mwnurnbe users      1872 Nov 27 10:03 aver_el.o
-rw-r-----   1 mwnurnbe users      3821 Oct 29 11:58 aver_n.F
-rw-r--r--   1 mwnurnbe users      3044 Nov 27 10:03 aver_n.o
-rw-r-----   1 mwnurnbe users      1730 Oct 29 11:58 avnorm.F
-rw-r--r--   1 mwnurnbe users      1088 Nov 27 10:03 avnorm.o
-rw-r-----   1 mwnurnbe users      1480 Oct 29 11:58 axes.F
-rw-r--r--   1 mwnurnbe users      1980 Nov 27 10:03 axes.o
-rw-r-----   1 mwnurnbe users      7776 Oct 29 11:58 cmemc.c
-rw-r--r--   1 mwnurnbe users      2260 Nov 27 10:04 cmemc.o
-rw-r-----   1 mwnurnbe users      1649 Oct 29 11:58 collapse.F
-rw-r--r--   1 mwnurnbe users      1568 Nov 27 10:03 collapse.o
-rw-r-----   1 mwnurnbe users      2196 Oct 29 11:58 con.F
-rw-r--r--   1 mwnurnbe users      1448 Nov 27 10:03 con.o
-rw-r-----   1 mwnurnbe users      1008 Oct 29 11:58 conout.F
-rw-r--r--   1 mwnurnbe users      1272 Nov 27 10:03 conout.o
-rw-r-----   1 mwnurnbe users      6018 Oct 29 11:58 convert.F
-rw-r--r--   1 mwnurnbe users      3876 Nov 27 10:03 convert.o
-rw-r-----   1 mwnurnbe users      1575 Oct 29 11:58 dvol.F
-rw-r--r--   1 mwnurnbe users      1244 Nov 27 10:03 dvol.o
-rw-r-----   1 mwnurnbe users      3353 Oct 29 11:58 dz.F
-rw-r--r--   1 mwnurnbe users      2632 Nov 27 10:03 dz.o
-rw-r-----   1 mwnurnbe users      1061 Oct 29 11:58 ecenter.F
-rw-r--r--   1 mwnurnbe users       820 Nov 27 10:03 ecenter.o
-rw-r-----   1 mwnurnbe users      2095 Oct 29 11:58 epsde.F
-rw-r--r--   1 mwnurnbe users      1356 Nov 27 10:03 epsde.o
-rw-r-----   1 mwnurnbe users      1841 Oct 29 11:58 extract.F
-rw-r--r--   1 mwnurnbe users      1160 Nov 27 10:03 extract.o
-rw-r-----   1 mwnurnbe users      1144 Oct 29 11:58 flt.F
-rw-r--r--   1 mwnurnbe users       656 Nov 27 10:03 flt.o
-rw-r-----   1 mwnurnbe users      1451 Oct 29 11:58 fortcall.h
-rw-r-----   1 mwnurnbe users       650 Oct 29 11:58 grafend.F
-rw-r-----   1 mwnurnbe users       467 Oct 29 11:58 grafini.F
-rw-r--r--   1 mwnurnbe users      5886 Nov  6 11:08 grp_unv.F
-rw-r--r--   1 mwnurnbe users      6776 Nov 27 10:04 grp_unv.o
-rw-r-----   1 mwnurnbe users      3335 Oct 29 11:58 gs.F
-rw-r--r--   1 mwnurnbe users      1932 Nov 27 10:03 gs.o
-rw-r-----   1 mwnurnbe users      2965 Oct 29 11:58 hyp_exp.F
-rw-r--r--   1 mwnurnbe users      2960 Nov 27 10:03 hyp_exp.o
-rw-r-----   1 mwnurnbe users      3926 Oct 29 11:58 hyp_imp.F
-rw-r--r--   1 mwnurnbe users      3852 Nov 27 10:03 hyp_imp.o
-rw-r-----   1 mwnurnbe users      4294 Oct 29 11:58 init.F
-rw-r--r--   1 mwnurnbe users      3248 Nov 27 10:03 init.o
-rw-r-----   1 mwnurnbe users      2575 Oct 29 11:58 matrices.F
-rw-r--r--   1 mwnurnbe users      1628 Nov 27 10:03 matrices.o
-rw-r-----   1 mwnurnbe users      1031 Oct 29 11:58 metrics.F
-rw-r--r--   1 mwnurnbe users       788 Nov 27 10:03 metrics.o
-rw-r-----   1 mwnurnbe users      1972 Oct 29 11:58 norms.F
-rw-r--r--   1 mwnurnbe users      2092 Nov 27 10:03 norms.o
-rw-r-----   1 mwnurnbe users      7412 Oct 29 11:58 opti.F
-rw-r--r--   1 mwnurnbe users      4756 Nov 27 10:03 opti.o
-rw-r-----   1 mwnurnbe users      1677 Oct 29 11:58 optpot.F
-rw-r--r--   1 mwnurnbe users      1372 Nov 27 10:03 optpot.o
-rw-r-----   1 mwnurnbe users       724 Oct 29 11:58 output.F
-rw-r--r--   1 mwnurnbe users       784 Nov 27 10:03 output.o
-rw-r-----   1 mwnurnbe users      1360 Oct 29 11:58 post_check.F
-rw-r--r--   1 mwnurnbe users      1388 Nov 27 10:03 post_check.o
-rw-r-----   1 mwnurnbe users      4116 Oct 29 11:58 pre_exp.F
-rw-r--r--   1 mwnurnbe users      3588 Nov 27 10:04 pre_exp.o
-rw-r-----   1 mwnurnbe users      3749 Oct 29 11:58 pre_imp.F
-rw-r--r--   1 mwnurnbe users      3024 Nov 27 10:03 pre_imp.o
-rw-r-----   1 mwnurnbe users     17391 Oct 29 11:58 prism.F
-rw-r--r--   1 mwnurnbe users     14384 Nov 27 10:04 prism.o
-rw-r-----   1 mwnurnbe users       538 Oct 29 11:58 reset.F
-rw-r--r--   1 mwnurnbe users       744 Nov 27 10:04 reset.o
-rw-r-----   1 mwnurnbe users      1843 Oct 29 11:58 rhs_exp.F
-rw-r--r--   1 mwnurnbe users      1588 Nov 27 10:03 rhs_exp.o
-rw-r-----   1 mwnurnbe users       643 Oct 29 11:58 rhs_imp.F
-rw-r--r--   1 mwnurnbe users       668 Nov 27 10:04 rhs_imp.o
-rw-r-----   1 mwnurnbe users      2785 Oct 29 11:58 setmat.F
-rw-r--r--   1 mwnurnbe users      2220 Nov 27 10:04 setmat.o
-rw-r-----   1 mwnurnbe users      2259 Oct 29 11:58 sharp.F
-rw-r--r--   1 mwnurnbe users      1376 Nov 27 10:04 sharp.o
-rw-r-----   1 mwnurnbe users      4231 Oct 29 11:58 smooth.F
-rw-r--r--   1 mwnurnbe users      2944 Nov 27 10:04 smooth.o
-rw-r-----   1 mwnurnbe users       487 Oct 29 11:58 smuth_im.F
-rw-r-----   1 mwnurnbe users       804 Oct 29 11:58 solmat.F
-rw-r--r--   1 mwnurnbe users       640 Nov 27 10:04 solmat.o
-rw-r-----   1 mwnurnbe users      2528 Oct 29 11:58 surface.F
-rw-r--r--   1 mwnurnbe users      1604 Nov 27 10:04 surface.o
-rw-r-----   1 mwnurnbe users       365 Oct 29 11:58 temp.c
-rw-r--r--   1 mwnurnbe users        71 Oct 29 11:58 unbuff.c
-rw-r--r--   1 mwnurnbe users       668 Nov 27 10:04 unbuff.o
-rw-r--r--   1 mwnurnbe users     14734 Oct 29 11:58 unv_out.F
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-rw-r--r--   1 mwnurnbe users      15692 Nov 27 10:04 unv_out.o
-rw-r-----   1 mwnurnbe users       5032 Oct 29 11:58 update_exp.F
-rw-r--r--   1 mwnurnbe users       3796 Nov 27 10:04 update_exp.o
-rw-r-----   1 mwnurnbe users       2576 Oct 29 11:58 update_imp.F
-rw-r--r--   1 mwnurnbe users       2624 Nov 27 10:04 update_imp.o
-rw-r-----   1 mwnurnbe users       2224 Oct 29 11:58 vec_alg.F
-rw-r--r--   1 mwnurnbe users       2084 Nov 27 10:04 vec_alg.o
-rw-r-----   1 mwnurnbe users        763 Oct 29 11:58 volav.F
-rw-r--r--   1 mwnurnbe users       1228 Nov 27 10:04 volav.o
-rw-r-----   1 mwnurnbe users        250 Oct 29 11:58 wordsz.h
-rw-r--r--   1 mwnurnbe users        316 Oct 29 11:58 wrapper.f
-rw-r-----   1 mwnurnbe users        567 Oct 29 11:58 xyz_out.F
-rw-r--r--   1 mwnurnbe users       1676 Nov 27 10:04 xyz_out.o

femats/src/solver:
total 6
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:42 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:05 hp/

femats/src/solver/hp:
total 410
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:05 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:42 ../
-rw-r--r--   1 mwnurnbe users       2351 Nov  2 15:17 Makefile
-rw-r--r--   1 mwnurnbe users       1270 Oct  5  1994 README
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:06 asc2bin/
-rw-r-----   1 mwnurnbe users       6560 Oct 25 17:21 bicg.F
-rw-r--r--   1 mwnurnbe users       4496 Nov 27 10:05 bicg.o
-rwxr--r--   1 mwnurnbe users       2183 Oct 25 17:21 diag.F*
-rw-r--r--   1 mwnurnbe users       1840 Nov 27 10:05 diag.o
-rwxr-xr-x   1 mwnurnbe users     102400 Nov 27 10:06 fem*
-rw-r--r--   1 mwnurnbe users      16685 Nov  5 11:28 fem.F
-rw-r--r--   1 mwnurnbe users      18212 Nov 27 10:05 fem.o
-rwxr--r--   1 mwnurnbe users        480 Oct 26 12:51 fem_data.h*
-rwxr--r--   1 mwnurnbe users       1981 Oct 25 17:21 jaggd.F*
-rw-r--r--   1 mwnurnbe users       2068 Nov 27 10:05 jaggd.o
-rwxr--r--   1 mwnurnbe users       6719 Oct 25 17:21 k2.F*
-rw-r--r--   1 mwnurnbe users       4312 Nov 27 10:05 k2.o
-rw-r-----   1 mwnurnbe users        772 Oct 25 17:21 mult.F
-rw-r--r--   1 mwnurnbe users        676 Nov 27 10:05 mult.o
-rw-r--r--   1 mwnurnbe users        437 Oct 25 17:21 second.F
-rw-r--r--   1 mwnurnbe users        752 Nov 27 10:05 second.O
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:06 sub/
-rw-r--r--   1 mwnurnbe users         71 Jul 29  1996 unbuff.c
-rw-r--r--   1 mwnurnbe users        684 Nov 27 10:05 unbuff.o
-rw-r--r--   1 mwnurnbe users       4414 Oct 25 17:21 xc.F
-rw-r--r--   1 mwnurnbe users       2568 Nov 27 10:05 xc.o

femats/src/solver/hp/asc2bin:
total 78
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:06 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:05 ../
-rwxr--r--   1 mwnurnbe users        480 Oct 26 12:53 fem_data.h*
-rwxr-xr-x   1 mwnurnbe users      28672 Nov 27 10:06 fr*
-rwxr--r--   1 mwnurnbe users       3249 Oct 25 17:23 fr.F*
-rw-r--r--   1 mwnurnbe users       3664 Nov 27 10:06 fr.o

femats/src/solver/hp/sub:
total 314
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 10:06 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 10:05 ../
-rwxr--r--   1 mwnurnbe users       1961 Oct 25 17:24 basis1.f*
-rw-r--r--   1 mwnurnbe users       2632 Nov 27 10:05 basis1.o
-rwxr--r--   1 mwnurnbe users      10850 Oct 25 17:24 bd1.f*
-rw-r--r--   1 mwnurnbe users       7864 Nov 27 10:05 bd1.o
-rwxr--r--   1 mwnurnbe users       6778 Oct 25 17:24 bi2mono.f*
-rw-r--r--   1 mwnurnbe users       7968 Nov 27 10:05 bi2mono.o
-rwxr--r--   1 mwnurnbe users        820 Oct 25 17:24 calc1.f*
-rw-r--r--   1 mwnurnbe users       1028 Nov 27 10:05 calc1.o
-rwxr--r--   1 mwnurnbe users       1507 Oct 25 17:24 comput.f*
-rw-r--r--   1 mwnurnbe users       1900 Nov 27 10:05 comput.o
-rwxr--r--   1 mwnurnbe users        928 Oct 25 17:24 crux.f*
-rw-r--r--   1 mwnurnbe users       1560 Nov 27 10:05 crux.o
-rw-r--r--   1 mwnurnbe users       1733 Oct 25 17:24 cruxd1.f
-rw-r--r--   1 mwnurnbe users       1496 Nov 27 10:05 cruxd1.o
-rwxr--r--   1 mwnurnbe users        908 Oct 25 17:24 f11.f*
-rw-r--r--   1 mwnurnbe users       1264 Nov 27 10:05 f11.o
-rwxr--r--   1 mwnurnbe users      13565 Oct 25 17:24 fcmb.f*
-rw-r--r--   1 mwnurnbe users      13676 Nov 27 10:06 fcmb.o
-rwxr--r--   1 mwnurnbe users        480 Oct 26 12:51 fem_data.h*
-rwxr--r--   1 mwnurnbe users       2600 Oct 25 17:24 finc.f*
-rw-r--r--   1 mwnurnbe users       3296 Nov 27 10:05 finc.o
-rwxr--r--   1 mwnurnbe users        801 Oct 25 17:24 heapsort.f*
-rw-r--r--   1 mwnurnbe users        800 Nov 27 10:06 heapsort.o
-rwxr--r--   1 mwnurnbe users       2226 Oct 25 17:24 incc1.f*
-rw-r--r--   1 mwnurnbe users       2576 Nov 27 10:06 incc1.o
-rwxr--r--   1 mwnurnbe users       2105 Oct 25 17:24 incd1.f*
-rw-r--r--   1 mwnurnbe users       3004 Nov 27 10:06 incd1.o
-rwxr--r--   1 mwnurnbe users       2247 Oct 25 17:24 inci.f*
-rw-r--r--   1 mwnurnbe users       3616 Nov 27 10:06 inci.o
-rwxr--r--   1 mwnurnbe users       2311 Oct 25 17:24 incr.f*
-rw-r--r--   1 mwnurnbe users       3596 Nov 27 10:06 incr.o
-rwxr--r--   1 mwnurnbe users       1542 Oct 25 17:24 norm2d.f*
-rw-r--r--   1 mwnurnbe users       2016 Nov 27 10:06 norm2d.o
-rwxr--r--   1 mwnurnbe users       2458 Oct 25 17:24 norma.f*
-rw-r--r--   1 mwnurnbe users       2544 Nov 27 10:06 norma.o
-rwxr--r--   1 mwnurnbe users       1359 Oct 25 17:24 ops.f*
-rw-r--r--   1 mwnurnbe users       2504 Nov 27 10:06 ops.o
-rwxr--r--   1 mwnurnbe users        560 Oct 25 17:24 ord.f*
-rw-r--r--   1 mwnurnbe users       1020 Nov 27 10:06 ord.o
-rwxr--r--   1 mwnurnbe users        625 Oct 25 17:24 sort.f*
-rw-r--r--   1 mwnurnbe users        896 Nov 27 10:06 sort.o
-rwxr--r--   1 mwnurnbe users        488 Oct 25 17:24 string.f*
-rw-r--r--   1 mwnurnbe users        700 Nov 27 10:06 string.o
-rwxr--r--   1 mwnurnbe users       1556 Oct 25 17:24 surfint1.f*
-rw-r--r--   1 mwnurnbe users       2028 Nov 27 10:06 surfint1.o
-rwxr--r--   1 mwnurnbe users       3363 Oct 25 17:24 value.f*
-rw-r--r--   1 mwnurnbe users       4096 Nov 27 10:06 value.o
-rwxr--r--   1 mwnurnbe users        439 Oct 25 17:24 volume.f*
-rw-r--r--   1 mwnurnbe users        656 Nov 27 10:06 volume.o

femats/src/tcl7.5:
total 242
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-r--r--r--   1 mwnurnbe users      16710 Apr 19  1996 README
-r--r--r--   1 mwnurnbe users      89520 Apr 18  1996 changes
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 compat/
drwxr-xr-x   2 mwnurnbe users       3072 Nov 27 09:43 doc/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 generic/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 library/
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-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 mac/
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:43 tests/
drwxr-xr-x   3 mwnurnbe users       2048 Nov 27 09:47 unix/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 win/

femats/src/tcl7.5/compat:
total 104
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 ./
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ../
-r--r--r--   1 mwnurnbe users        432 Feb 17  1996 README
-r--r--r--   1 mwnurnbe users        550 Feb 17  1996 dirent.h
-r--r--r--   1 mwnurnbe users       1399 Feb 17  1996 dirent2.h
-r--r--r--   1 mwnurnbe users       1749 Mar 14  1996 dlfcn.h
-r--r--r--   1 mwnurnbe users        884 Feb 17  1996 fixstrtod.c
-r--r--r--   1 mwnurnbe users        565 Feb 17  1996 float.h
-r--r--r--   1 mwnurnbe users       1105 Feb 17  1996 getcwd.c
-r--r--r--   1 mwnurnbe users        626 Feb 17  1996 gettod.c
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users        686 Feb 17  1996 limits.h
-r--r--r--   1 mwnurnbe users       2032 Feb 17  1996 opendir.c
-r--r--r--   1 mwnurnbe users       1710 Feb 17  1996 stdlib.h
-r--r--r--   1 mwnurnbe users       2444 Apr 10  1996 string.h
-r--r--r--   1 mwnurnbe users       3155 Feb 17  1996 strncasecmp.c
-r--r--r--   1 mwnurnbe users       1603 Feb 17  1996 strstr.c
-r--r--r--   1 mwnurnbe users       5881 Feb 17  1996 strtod.c
-r--r--r--   1 mwnurnbe users       1949 Feb 17  1996 strtol.c
-r--r--r--   1 mwnurnbe users       4000 Feb 17  1996 strtoul.c
-r--r--r--   1 mwnurnbe users       1029 Feb 17  1996 tmpnam.c
-r--r--r--   1 mwnurnbe users       3287 Feb 17  1996 unistd.h
-r--r--r--   1 mwnurnbe users       4667 Feb 17  1996 waitpid.c

femats/src/tcl7.5/doc:
total 1174
drwxr-xr-x   2 mwnurnbe users       3072 Nov 27 09:43 ./
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ../
-r--r--r--   1 mwnurnbe users       5551 Mar 27  1996 AddErrInfo.3
-r--r--r--   1 mwnurnbe users       1399 Mar 27  1996 AllowExc.3
-r--r--r--   1 mwnurnbe users       2797 Mar 27  1996 AppInit.3
-r--r--r--   1 mwnurnbe users       3563 Mar 27  1996 AssocData.3
-r--r--r--   1 mwnurnbe users       6337 Mar 27  1996 Async.3
-r--r--r--   1 mwnurnbe users       2302 Mar 27  1996 BackgdErr.3
-r--r--r--   1 mwnurnbe users       1306 Mar 27  1996 Backslash.3
-r--r--r--   1 mwnurnbe users       2198 Mar 27  1996 CallDel.3
-r--r--r--   1 mwnurnbe users       1008 Mar 27  1996 CmdCmplt.3
-r--r--r--   1 mwnurnbe users       1708 Mar 27  1996 Concat.3
-r--r--r--   1 mwnurnbe users      18299 Apr  8  1996 CrtChannel.3
-r--r--r--   1 mwnurnbe users       3773 Mar 14  1996 CrtChnlHdlr.3
-r--r--r--   1 mwnurnbe users       1837 Apr 15  1996 CrtCloseHdlr.3
-r--r--r--   1 mwnurnbe users       7594 Mar 27  1996 CrtCommand.3
-r--r--r--   1 mwnurnbe users       3513 Mar 27  1996 CrtFileHdlr.3
-r--r--r--   1 mwnurnbe users       6066 Mar 27  1996 CrtInterp.3
-r--r--r--   1 mwnurnbe users       3612 Mar 27  1996 CrtMathFnc.3
-r--r--r--   1 mwnurnbe users       2916 Mar 27  1996 CrtModalTmt.3
-r--r--r--   1 mwnurnbe users       5919 Mar 27  1996 CrtSlave.3
-r--r--r--   1 mwnurnbe users       2680 Mar 27  1996 CrtTimerHdlr.3
-r--r--r--   1 mwnurnbe users       4536 Mar 27  1996 CrtTrace.3
-r--r--r--   1 mwnurnbe users       5816 Mar 27  1996 DString.3
-r--r--r--   1 mwnurnbe users       2513 Mar 27  1996 DetachPids.3
-r--r--r--   1 mwnurnbe users       4156 Mar 27  1996 DoOneEvent.3
-r--r--r--   1 mwnurnbe users       3376 Mar 27  1996 DoWhenIdle.3
-r--r--r--   1 mwnurnbe users       4066 Mar 27  1996 Eval.3
-r--r--r--   1 mwnurnbe users       2305 Mar 27  1996 Exit.3
-r--r--r--   1 mwnurnbe users       3867 Mar 27  1996 ExprLong.3
-r--r--r--   1 mwnurnbe users       1485 Mar 27  1996 FindExec.3
-r--r--r--   1 mwnurnbe users       5037 Mar 27  1996 GetFile.3
-r--r--r--   1 mwnurnbe users       3154 Mar 27  1996 GetInt.3
-r--r--r--   1 mwnurnbe users       2020 Mar 27  1996 GetOpnFl.3
-r--r--r--   1 mwnurnbe users       3028 Mar  8  1996 GetStdChan.3
-r--r--r--   1 mwnurnbe users       8326 Mar 27  1996 Hash.3
-r--r--r--   1 mwnurnbe users       5439 Mar 27  1996 Interp.3
-r--r--r--   1 mwnurnbe users       4295 Mar 27  1996 LinkVar.3
-r--r--r--   1 mwnurnbe users      16869 Mar 28  1996 Notifier.3
-r--r--r--   1 mwnurnbe users      19135 Apr 13  1996 OpenFileChnl.3
-r--r--r--   1 mwnurnbe users       6252 Mar 27  1996 OpenTcp.3
-r--r--r--   1 mwnurnbe users       1906 Feb 17  1996 PkgRequire.3
-r--r--r--   1 mwnurnbe users       4097 Mar 27  1996 Preserve.3
-r--r--r--   1 mwnurnbe users       1555 Mar 27  1996 PrintDbl.3
-r--r--r--   1 mwnurnbe users       1817 Mar 27  1996 RecordEval.3
-r--r--r--   1 mwnurnbe users       5107 Feb 17  1996 RegExp.3
-r--r--r--   1 mwnurnbe users       1457 Feb 17  1996 SetErrno.3
-r--r--r--   1 mwnurnbe users       1916 Mar 27  1996 SetRecLmt.3
-r--r--r--   1 mwnurnbe users       6024 Mar 27  1996 SetResult.3
-r--r--r--   1 mwnurnbe users       5981 Mar 27  1996 SetVar.3
-r--r--r--   1 mwnurnbe users       1107 Mar 27  1996 Sleep.3
-r--r--r--   1 mwnurnbe users       6549 Mar 27  1996 SplitList.3
-r--r--r--   1 mwnurnbe users       2641 Mar 15  1996 StaticPkg.3
-r--r--r--   1 mwnurnbe users       1167 Mar 27  1996 StrMatch.3
-r--r--r--   1 mwnurnbe users       7036 Mar 27  1996 Tcl.n
-r--r--r--   1 mwnurnbe users       2209 Mar 27  1996 Tcl_Main.3
-r--r--r--   1 mwnurnbe users      14192 Mar 27  1996 TraceVar.3
-r--r--r--   1 mwnurnbe users       2422 Mar 27  1996 Translate.3
-r--r--r--   1 mwnurnbe users       2821 Mar 27  1996 UpVar.3
-r--r--r--   1 mwnurnbe users       4352 Mar 27  1996 after.n
-r--r--r--   1 mwnurnbe users        992 Mar 27  1996 append.n
-r--r--r--   1 mwnurnbe users       4824 Mar 27  1996 array.n
-r--r--r--   1 mwnurnbe users       2846 Mar 27  1996 bgerror.n
-r--r--r--   1 mwnurnbe users       1079 Mar 27  1996 break.n
-r--r--r--   1 mwnurnbe users       2581 Mar 27  1996 case.n
-r--r--r--   1 mwnurnbe users       1553 Mar 27  1996 catch.n
-r--r--r--   1 mwnurnbe users        754 Mar 28  1996 cd.n
-r--r--r--   1 mwnurnbe users       6145 Apr 16  1996 clock.n
-r--r--r--   1 mwnurnbe users       2153 Feb 17  1996 close.n
-r--r--r--   1 mwnurnbe users       1048 Mar 27  1996 concat.n
-r--r--r--   1 mwnurnbe users       1103 Mar 27  1996 continue.n
-r--r--r--   1 mwnurnbe users        733 Feb 17  1996 eof.n
-r--r--r--   1 mwnurnbe users       2203 Mar 27  1996 error.n
-r--r--r--   1 mwnurnbe users        936 Mar 27  1996 eval.n
-r--r--r--   1 mwnurnbe users       6809 Mar 27  1996 exec.n
-r--r--r--   1 mwnurnbe users        715 Mar 27  1996 exit.n
-r--r--r--   1 mwnurnbe users      10895 Mar 14  1996 expr.n
-r--r--r--   1 mwnurnbe users        986 Feb 29  1996 fblocked.n
-r--r--r--   1 mwnurnbe users       7909 Apr 16  1996 fconfigure.n
-r--r--r--   1 mwnurnbe users       7722 Apr 11  1996 file.n
-r--r--r--   1 mwnurnbe users       5042 Feb 29  1996 fileevent.n
-r--r--r--   1 mwnurnbe users       7828 Apr 11  1996 filename.n
-r--r--r--   1 mwnurnbe users       1231 Feb 17  1996 flush.n
-r--r--r--   1 mwnurnbe users       1621 Mar 27  1996 for.n
-r--r--r--   1 mwnurnbe users       2817 Mar 27  1996 foreach.n
-r--r--r--   1 mwnurnbe users       8730 Mar 27  1996 format.n
-r--r--r--   1 mwnurnbe users       1877 Feb 17  1996 gets.n
-r--r--r--   1 mwnurnbe users       2956 Mar 27  1996 glob.n
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-r--r--r--   1 mwnurnbe users        966 Mar 27  1996 global.n
-r--r--r--   1 mwnurnbe users       6561 Mar 27  1996 history.n
-r--r--r--   1 mwnurnbe users       1718 Mar 27  1996 if.n
-r--r--r--   1 mwnurnbe users        994 Mar 27  1996 incr.n
-r--r--r--   1 mwnurnbe users       6631 Mar 27  1996 info.n
-r--r--r--   1 mwnurnbe users      17078 Mar 27  1996 interp.n
-r--r--r--   1 mwnurnbe users        896 Mar 27  1996 join.n
-r--r--r--   1 mwnurnbe users       1247 Mar 27  1996 lappend.n
-r--r--r--   1 mwnurnbe users       6969 Mar 27  1996 library.n
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users       1162 Mar 27  1996 lindex.n
-r--r--r--   1 mwnurnbe users       1141 Mar 27  1996 linsert.n
-r--r--r--   1 mwnurnbe users       1404 Mar 27  1996 list.n
-r--r--r--   1 mwnurnbe users        694 Mar 27  1996 llength.n
-r--r--r--   1 mwnurnbe users       4530 Mar 27  1996 load.n
-r--r--r--   1 mwnurnbe users       1440 Mar 27  1996 lrange.n
-r--r--r--   1 mwnurnbe users       1669 Mar 27  1996 lreplace.n
-r--r--r--   1 mwnurnbe users       1486 Mar 27  1996 lsearch.n
-r--r--r--   1 mwnurnbe users       1784 Mar 27  1996 lsort.n
-r--r--r--   1 mwnurnbe users       4741 Feb 17  1996 man.macros
-r--r--r--   1 mwnurnbe users       4481 Feb 17  1996 open.n
-r--r--r--   1 mwnurnbe users       8805 Mar 21  1996 package.n
-r--r--r--   1 mwnurnbe users       1118 Mar 27  1996 pid.n
-r--r--r--   1 mwnurnbe users       5239 Feb 17  1996 pkgMkIndex.n
-r--r--r--   1 mwnurnbe users       2951 Mar 27  1996 proc.n
-r--r--r--   1 mwnurnbe users       2848 Feb 17  1996 puts.n
-r--r--r--   1 mwnurnbe users        626 Mar 27  1996 pwd.n
-r--r--r--   1 mwnurnbe users       1777 Feb 17  1996 read.n
-r--r--r--   1 mwnurnbe users       6290 Mar 27  1996 regexp.n
-r--r--r--   1 mwnurnbe users       2804 Mar 27  1996 regsub.n
-r--r--r--   1 mwnurnbe users        822 Mar 27  1996 rename.n
-r--r--r--   1 mwnurnbe users       3202 Mar 27  1996 return.n
-r--r--r--   1 mwnurnbe users       5556 Mar 27  1996 scan.n
-r--r--r--   1 mwnurnbe users       2010 Feb 17  1996 seek.n
-r--r--r--   1 mwnurnbe users       1376 Mar 27  1996 set.n
-r--r--r--   1 mwnurnbe users       5365 Apr  8  1996 socket.n
-r--r--r--   1 mwnurnbe users       1732 Apr 15  1996 source.n
-r--r--r--   1 mwnurnbe users       1397 Mar 27  1996 split.n
-r--r--r--   1 mwnurnbe users       5275 Mar 27  1996 string.n
-r--r--r--   1 mwnurnbe users       1721 Mar 27  1996 subst.n
-r--r--r--   1 mwnurnbe users       3593 Mar 27  1996 switch.n
-r--r--r--   1 mwnurnbe users       4768 Mar 27  1996 tclsh.1
-r--r--r--   1 mwnurnbe users       9131 Apr 12  1996 tclvars.n
-r--r--r--   1 mwnurnbe users        773 Feb 17  1996 tell.n
-r--r--r--   1 mwnurnbe users        934 Mar 27  1996 time.n
-r--r--r--   1 mwnurnbe users       6646 Mar 27  1996 trace.n
-r--r--r--   1 mwnurnbe users       3347 Mar 27  1996 unknown.n
-r--r--r--   1 mwnurnbe users       1133 Mar 27  1996 unset.n
-r--r--r--   1 mwnurnbe users       1923 Mar 27  1996 update.n
-r--r--r--   1 mwnurnbe users       2764 Mar 27  1996 uplevel.n
-r--r--r--   1 mwnurnbe users       3172 Mar 27  1996 upvar.n
-r--r--r--   1 mwnurnbe users       1358 Mar 27  1996 vwait.n
-r--r--r--   1 mwnurnbe users       1330 Mar 27  1996 while.n

femats/src/tcl7.5/generic:
total 2708
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 ./
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ../
-r--r--r--   1 mwnurnbe users        245 Sep 11  1995 README
-r--r--r--   1 mwnurnbe users       2153 Feb 17  1996 panic.c
-r--r--r--   1 mwnurnbe users        934 Apr 11  1996 patchlevel.h
-r--r--r--   1 mwnurnbe users      33096 Apr  8  1996 regexp.c
-r--r--r--   1 mwnurnbe users      39934 Apr 11  1996 tcl.h
-r--r--r--   1 mwnurnbe users       6948 Feb 17  1996 tclAsync.c
-r--r--r--   1 mwnurnbe users      50290 Mar 27  1996 tclBasic.c
-r--r--r--   1 mwnurnbe users      20506 Mar 14  1996 tclCkalloc.c
-r--r--r--   1 mwnurnbe users       9071 Mar 28  1996 tclClock.c
-r--r--r--   1 mwnurnbe users      42320 Apr 10  1996 tclCmdAH.c
-r--r--r--   1 mwnurnbe users      39443 Mar 27  1996 tclCmdIL.c
-r--r--r--   1 mwnurnbe users      52843 Feb 11  1996 tclCmdMZ.c
-r--r--r--   1 mwnurnbe users      46659 Apr 18  1996 tclDate.c
-r--r--r--   1 mwnurnbe users      15423 Apr 16  1996 tclEnv.c
-r--r--r--   1 mwnurnbe users      62253 Mar 27  1996 tclEvent.c
-r--r--r--   1 mwnurnbe users      55055 Feb 17  1996 tclExpr.c
-r--r--r--   1 mwnurnbe users       6000 Feb 14  1996 tclFHandle.c
-r--r--r--   1 mwnurnbe users      40031 Apr 19  1996 tclFileName.c
-r--r--r--   1 mwnurnbe users       6213 Feb 17  1996 tclGet.c
-r--r--r--   1 mwnurnbe users      25921 Feb 17  1996 tclGetDate.y
-r--r--r--   1 mwnurnbe users      24658 Feb 17  1996 tclHash.c
-r--r--r--   1 mwnurnbe users      30341 Feb 17  1996 tclHistory.c
-r--r--r--   1 mwnurnbe users     165053 Apr 18  1996 tclIO.c
-r--r--r--   1 mwnurnbe users      44866 Apr 17  1996 tclIOCmd.c
-r--r--r--   1 mwnurnbe users       2472 Mar 14  1996 tclIOSock.c
-r--r--r--   1 mwnurnbe users      38173 Apr  8  1996 tclIOUtil.c
-r--r--r--   1 mwnurnbe users      43607 Apr 11  1996 tclInt.h
-r--r--r--   1 mwnurnbe users      82989 Apr 17  1996 tclInterp.c
-r--r--r--   1 mwnurnbe users      11719 Feb 17  1996 tclLink.c
-r--r--r--   1 mwnurnbe users      17105 Apr  8  1996 tclLoad.c
-r--r--r--   1 mwnurnbe users       2352 Feb 17  1996 tclLoadNone.c
-r--r--r--   1 mwnurnbe users       9576 Apr 11  1996 tclMain.c
-r--r--r--   1 mwnurnbe users      16875 Feb 29  1996 tclNotify.c
-r--r--r--   1 mwnurnbe users      39166 Mar  2  1996 tclParse.c
-r--r--r--   1 mwnurnbe users      21149 Feb 17  1996 tclPkg.c
-r--r--r--   1 mwnurnbe users        667 Feb 11  1996 tclPort.h
-r--r--r--   1 mwnurnbe users      27325 Feb 11  1996 tclPosixStr.c
-r--r--r--   1 mwnurnbe users       7169 Mar 27  1996 tclPreserve.c
-r--r--r--   1 mwnurnbe users      17246 Feb 17  1996 tclProc.c
-r--r--r--   1 mwnurnbe users       1038 Apr  8  1996 tclRegexp.h
-r--r--r--   1 mwnurnbe users      56511 Apr 11  1996 tclTest.c
-r--r--r--   1 mwnurnbe users      56245 Feb 17  1996 tclUtil.c
-r--r--r--   1 mwnurnbe users      74143 Feb 29  1996 tclVar.c

femats/src/tcl7.5/library:
total 60
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 ./
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ../
-r--r--r--   1 mwnurnbe users      15724 Apr 21  1996 init.tcl
-r--r--r--   1 mwnurnbe users       6251 Apr 11  1996 ldAout.tcl
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users        858 Feb 17  1996 parray.tcl
-r--r--r--   1 mwnurnbe users       1093 Apr 11  1996 tclIndex

femats/src/tcl7.5/mac:
total 576
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 ./
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ../
-r--r--r--   1 mwnurnbe users       1002 Mar  8  1996 MW_TclHeader.h
-r--r--r--   1 mwnurnbe users       7516 Apr 10  1996 README
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users        826 Sep 15  1995 porting.notes
-r--r--r--   1 mwnurnbe users       4930 Apr  8  1996 tclMacAppInit.c
-r--r--r--   1 mwnurnbe users      12588 Apr 12  1996 tclMacChan.c
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-r--r--r--   1 mwnurnbe users      13348 Apr 10  1996 tclMacEnv.c
-r--r--r--   1 mwnurnbe users      36826 Apr 10  1996 tclMacFile.c
-r--r--r--   1 mwnurnbe users       4345 Apr 10  1996 tclMacInit.c
-r--r--r--   1 mwnurnbe users       1698 Mar 27  1996 tclMacInt.h
-r--r--r--   1 mwnurnbe users      12454 Mar 27  1996 tclMacInterupt.c
-r--r--r--   1 mwnurnbe users       3955 Mar 27  1996 tclMacLoad.c
-r--r--r--   1 mwnurnbe users      16004 Apr 11  1996 tclMacNotify.c
-r--r--r--   1 mwnurnbe users       5551 Apr  8  1996 tclMacPanic.c
-r--r--r--   1 mwnurnbe users       6264 Apr 12  1996 tclMacPort.h
-rw-r--r--   1 mwnurnbe users      45074 Apr 21  1996 tclMacProjects.sit.hqx
-r--r--r--   1 mwnurnbe users       2339 Apr 11  1996 tclMacResource.r
-r--r--r--   1 mwnurnbe users      53700 Apr 12  1996 tclMacSock.c
-r--r--r--   1 mwnurnbe users       4896 Apr  8  1996 tclMacTest.c
-r--r--r--   1 mwnurnbe users       6504 Feb 17  1996 tclMacTime.c
-r--r--r--   1 mwnurnbe users      29041 Apr 10  1996 tclMacUnix.c
-r--r--r--   1 mwnurnbe users      10917 Apr  8  1996 tclMacUtil.c

femats/src/tcl7.5/tests:
total 1360
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:43 ./
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ../
-r--r--r--   1 mwnurnbe users       3716 Apr 17  1996 README
-r--r--r--   1 mwnurnbe users        392 Mar  5  1996 all
-r--r--r--   1 mwnurnbe users       4188 Apr 10  1996 append.test
-r--r--r--   1 mwnurnbe users       1750 Jan 16  1996 assocd.test
-r--r--r--   1 mwnurnbe users       3731 Apr 10  1996 async.test
-r--r--r--   1 mwnurnbe users       2847 Feb 17  1996 case.test
-r--r--r--   1 mwnurnbe users       3563 Apr 10  1996 clock.test
-r--r--r--   1 mwnurnbe users      32720 Apr 13  1996 cmdAH.test
-r--r--r--   1 mwnurnbe users       2287 Apr 10  1996 cmdInfo.test
-r--r--r--   1 mwnurnbe users       1264 Feb 17  1996 concat.test
-r--r--r--   1 mwnurnbe users       1289 Feb 17  1996 dcall.test
-r--r--r--   1 mwnurnbe users      10394 Apr 13  1996 defs
-r--r--r--   1 mwnurnbe users       7592 Feb 17  1996 dstring.test
-r--r--r--   1 mwnurnbe users       2870 Feb 17  1996 env.test
-r--r--r--   1 mwnurnbe users       4757 Feb 17  1996 error.test
-r--r--r--   1 mwnurnbe users       1522 Feb 17  1996 eval.test
-r--r--r--   1 mwnurnbe users      25742 Apr 10  1996 event.test
-r--r--r--   1 mwnurnbe users      17137 Apr 13  1996 exec.test
-r--r--r--   1 mwnurnbe users      34384 Feb 17  1996 expr.test
-r--r--r--   1 mwnurnbe users       1919 Mar 26  1996 fhandle.test
-r--r--r--   1 mwnurnbe users      42097 Apr 19  1996 fileName.test
-r--r--r--   1 mwnurnbe users       5495 Feb 17  1996 for.test
-r--r--r--   1 mwnurnbe users      15586 Feb 17  1996 format.test
-r--r--r--   1 mwnurnbe users       2645 Apr 10  1996 get.test
-r--r--r--   1 mwnurnbe users      12467 Feb 17  1996 history.test
-r--r--r--   1 mwnurnbe users       4221 Feb 17  1996 if.test
-r--r--r--   1 mwnurnbe users       2698 Feb 17  1996 incr.test
-r--r--r--   1 mwnurnbe users      16577 Mar 27  1996 info.test
-r--r--r--   1 mwnurnbe users      17374 Mar 27  1996 interp.test
-r--r--r--   1 mwnurnbe users     112192 Apr 18  1996 io.test
-r--r--r--   1 mwnurnbe users      15747 Apr 13  1996 ioCmd.test
-r--r--r--   1 mwnurnbe users       1276 Feb 17  1996 join.test
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users       2338 Feb 17  1996 lindex.test
-r--r--r--   1 mwnurnbe users       6792 Feb 17  1996 link.test
-r--r--r--   1 mwnurnbe users       2833 Feb 17  1996 linsert.test
-r--r--r--   1 mwnurnbe users       2865 Feb 17  1996 list.test
-r--r--r--   1 mwnurnbe users       1173 Feb 17  1996 llength.test
-rw-r--r--   1 mwnurnbe users       6093 Apr 16  1996 load.test
-r--r--r--   1 mwnurnbe users       2586 Feb 17  1996 lrange.test
-r--r--r--   1 mwnurnbe users       3588 Feb 17  1996 lreplace.test
-r--r--r--   1 mwnurnbe users       2276 Feb 17  1996 lsearch.test
-r--r--r--   1 mwnurnbe users       4950 Feb 17  1996 lsort.test
-r--r--r--   1 mwnurnbe users       2053 Feb 17  1996 misc.test
-r--r--r--   1 mwnurnbe users      14376 Mar  2  1996 parse.test
-r--r--r--   1 mwnurnbe users       1623 Apr 13  1996 pid.test
-r--r--r--   1 mwnurnbe users      19319 Mar 27  1996 pkg.test
-r--r--r--   1 mwnurnbe users      13189 Feb 17  1996 proc.test
-r--r--r--   1 mwnurnbe users      11035 Apr  8  1996 regexp.test
-r--r--r--   1 mwnurnbe users       4203 Apr 17  1996 remote.tcl
-r--r--r--   1 mwnurnbe users       4281 Mar 27  1996 rename.test
-r--r--r--   1 mwnurnbe users       9601 Feb 17  1996 scan.test
-r--r--r--   1 mwnurnbe users      21505 Feb 17  1996 set.test
-r--r--r--   1 mwnurnbe users      26460 Apr 21  1996 socket.test
-r--r--r--   1 mwnurnbe users       6292 Apr 10  1996 source.test
-r--r--r--   1 mwnurnbe users       1462 Feb 17  1996 split.test
-r--r--r--   1 mwnurnbe users      11688 Feb 17  1996 string.test
-r--r--r--   1 mwnurnbe users       3561 Feb 17  1996 subst.test
-r--r--r--   1 mwnurnbe users       4921 Feb 17  1996 switch.test
-r--r--r--   1 mwnurnbe users      27888 Feb 17  1996 trace.test
-r--r--r--   1 mwnurnbe users       1752 Feb 17  1996 unknown.test
-r--r--r--   1 mwnurnbe users       2763 Feb 17  1996 uplevel.test
-r--r--r--   1 mwnurnbe users       8927 Feb 29  1996 upvar.test
-r--r--r--   1 mwnurnbe users       2772 Feb 17  1996 while.test

femats/src/tcl7.5/unix:
total 3430
drwxr-xr-x   3 mwnurnbe users       2048 Nov 27 09:47 ./
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ../
-rw-r--r--   1 mwnurnbe users      24988 Nov 27 09:44 Makefile
-rw-r--r--   1 mwnurnbe users      24836 Apr 21  1996 Makefile.in
-r--r--r--   1 mwnurnbe users       5616 Apr 21  1996 README
-rw-r--r--   1 mwnurnbe users      16384 Nov 27 09:44 a.out
-r--r--r--   1 mwnurnbe users       2974 Mar 12  1996 bp.c
-rw-r--r--   1 mwnurnbe users       2796 Nov 27 09:44 config.cache
-rw-r--r--   1 mwnurnbe users       1974 Nov 27 09:44 config.log
-rwxr-xr-x   1 mwnurnbe users       4168 Nov 27 09:44 config.status*
-rwxr-xr-x   1 mwnurnbe users      97794 Apr 21  1996 configure*
-rwxr-xr-x   1 mwnurnbe users      29415 Apr 21  1996 configure.in*
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 dltest/
-r-xr-xr-x   1 mwnurnbe users       2186 Apr 21  1996 install-sh*
-rwxr-xr-x   1 mwnurnbe users       2620 Apr 21  1996 ldAix*
-rw-r--r--   1 mwnurnbe users     418788 Nov 27 09:46 libtcl7.5.a
-rwxr-xr-x   1 mwnurnbe users      19512 Apr 21  1996 mkLinks*
-rw-r--r--   1 mwnurnbe users       1392 Nov 27 09:44 panic.o
-r--r--r--   1 mwnurnbe users      12133 Apr 21  1996 porting.notes
-r--r--r--   1 mwnurnbe users      14659 Apr 21  1996 porting.old
-rw-r--r--   1 mwnurnbe users       9164 Nov 27 09:44 regexp.o
-r--r--r--   1 mwnurnbe users       3105 Mar 27  1996 tclAppInit.c
-rw-r--r--   1 mwnurnbe users       1188 Nov 27 09:46 tclAppInit.o
-rw-r--r--   1 mwnurnbe users       1916 Nov 27 09:44 tclAsync.o
-rw-r--r--   1 mwnurnbe users      17628 Nov 27 09:44 tclBasic.o
-rw-r--r--   1 mwnurnbe users       2384 Nov 27 09:44 tclCkalloc.o
-rw-r--r--   1 mwnurnbe users       4168 Nov 27 09:44 tclClock.o
-rw-r--r--   1 mwnurnbe users      16520 Nov 27 09:44 tclCmdAH.o
-rw-r--r--   1 mwnurnbe users      17616 Nov 27 09:44 tclCmdIL.o
-rw-r--r--   1 mwnurnbe users      22156 Nov 27 09:44 tclCmdMZ.o
-rw-r--r--   1 mwnurnbe users       3670 Nov 27 09:44 tclConfig.sh
-r--r--r--   1 mwnurnbe users       3621 Apr 21  1996 tclConfig.sh.in
-rw-r--r--   1 mwnurnbe users      15116 Nov 27 09:44 tclDate.o
-rw-r--r--   1 mwnurnbe users       4708 Nov 27 09:44 tclEnv.o
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-rw-r--r--   1 mwnurnbe users      16252 Nov 27 09:45 tclEvent.o
-rw-r--r--   1 mwnurnbe users      17768 Nov 27 09:45 tclExpr.o
-rw-r--r--   1 mwnurnbe users       2408 Nov 27 09:45 tclFHandle.o
-rw-r--r--   1 mwnurnbe users      12620 Nov 27 09:45 tclFileName.o
-rw-r--r--   1 mwnurnbe users       2700 Nov 27 09:45 tclGet.o
-rw-r--r--   1 mwnurnbe users       6312 Nov 27 09:45 tclHash.o
-rw-r--r--   1 mwnurnbe users       9332 Nov 27 09:45 tclHistory.o
-rw-r--r--   1 mwnurnbe users      35168 Nov 27 09:45 tclIO.o
-rw-r--r--   1 mwnurnbe users      15428 Nov 27 09:45 tclIOCmd.o
-rw-r--r--   1 mwnurnbe users       1392 Nov 27 09:45 tclIOSock.o
-rw-r--r--   1 mwnurnbe users      11356 Nov 27 09:45 tclIOUtil.o
-rw-r--r--   1 mwnurnbe users      23676 Nov 27 09:45 tclInterp.o
-rw-r--r--   1 mwnurnbe users       3940 Nov 27 09:46 tclLink.o
-rw-r--r--   1 mwnurnbe users       5780 Nov 27 09:46 tclLoad.o
-r--r--r--   1 mwnurnbe users      13116 Mar 26  1996 tclLoadAix.c
-r--r--r--   1 mwnurnbe users      12519 Feb 17  1996 tclLoadAout.c
-r--r--r--   1 mwnurnbe users       3237 Mar 14  1996 tclLoadDl.c
-r--r--r--   1 mwnurnbe users       3403 Feb 17  1996 tclLoadDl2.c
-r--r--r--   1 mwnurnbe users       3691 Feb 17  1996 tclLoadDld.c
-r--r--r--   1 mwnurnbe users       3258 Feb 17  1996 tclLoadNext.c
-r--r--r--   1 mwnurnbe users       3953 Feb 17  1996 tclLoadOSF.c
-r--r--r--   1 mwnurnbe users       3752 Mar 15  1996 tclLoadShl.c
-rw-r--r--   1 mwnurnbe users       1500 Nov 27 09:46 tclLoadShl.o
-rw-r--r--   1 mwnurnbe users       3764 Nov 27 09:46 tclMain.o
-r--r--r--   1 mwnurnbe users       1979 Feb 17  1996 tclMtherr.c
-rw-r--r--   1 mwnurnbe users        704 Nov 27 09:46 tclMtherr.o
-rw-r--r--   1 mwnurnbe users       3708 Nov 27 09:46 tclNotify.o
-rw-r--r--   1 mwnurnbe users       8820 Nov 27 09:46 tclParse.o
-rw-r--r--   1 mwnurnbe users       7452 Nov 27 09:46 tclPkg.o
-rw-r--r--   1 mwnurnbe users      14412 Nov 27 09:46 tclPosixStr.o
-rw-r--r--   1 mwnurnbe users       2836 Nov 27 09:46 tclPreserve.o
-rw-r--r--   1 mwnurnbe users       5752 Nov 27 09:46 tclProc.o
-r--r--r--   1 mwnurnbe users      54524 Apr 18  1996 tclUnixChan.c
-rw-r--r--   1 mwnurnbe users      14480 Nov 27 09:46 tclUnixChan.o
-r--r--r--   1 mwnurnbe users      18889 Apr 18  1996 tclUnixFile.c
-rw-r--r--   1 mwnurnbe users       7436 Nov 27 09:46 tclUnixFile.o
-r--r--r--   1 mwnurnbe users       4456 Mar 12  1996 tclUnixInit.c
-rw-r--r--   1 mwnurnbe users       2656 Nov 27 09:46 tclUnixInit.o
-r--r--r--   1 mwnurnbe users       8646 Mar 27  1996 tclUnixNotfy.c
-rw-r--r--   1 mwnurnbe users       2828 Nov 27 09:46 tclUnixNotfy.o
-r--r--r--   1 mwnurnbe users      11962 Apr 18  1996 tclUnixPipe.c
-rw-r--r--   1 mwnurnbe users       4468 Nov 27 09:46 tclUnixPipe.o
-r--r--r--   1 mwnurnbe users       8696 Mar 27  1996 tclUnixPort.h
-r--r--r--   1 mwnurnbe users       1337 Apr  8  1996 tclUnixSock.c
-rw-r--r--   1 mwnurnbe users       1056 Nov 27 09:46 tclUnixSock.o
-r--r--r--   1 mwnurnbe users      11111 Mar 27  1996 tclUnixTest.c
-r--r--r--   1 mwnurnbe users       5033 Feb 17  1996 tclUnixTime.c
-rw-r--r--   1 mwnurnbe users       1524 Nov 27 09:46 tclUnixTime.o
-rw-r--r--   1 mwnurnbe users      14892 Nov 27 09:46 tclUtil.o
-rw-r--r--   1 mwnurnbe users      18248 Nov 27 09:46 tclVar.o
-rwxr-xr-x   1 mwnurnbe users     425984 Nov 27 09:46 tclsh*

femats/src/tcl7.5/unix/dltest:
total 94
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 ./
drwxr-xr-x   3 mwnurnbe users       2048 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users       1500 Apr 15  1996 Makefile.in
-r--r--r--   1 mwnurnbe users        641 Aug 22  1995 README
-rwxr-xr-x   1 mwnurnbe users      19985 Apr 15  1996 configure*
-r--r--r--   1 mwnurnbe users        741 Apr 15  1996 configure.in
-r--r--r--   1 mwnurnbe users       3278 Feb 17  1996 pkga.c
-r--r--r--   1 mwnurnbe users       3885 Feb 17  1996 pkgb.c
-r--r--r--   1 mwnurnbe users       3887 Feb 17  1996 pkgc.c
-r--r--r--   1 mwnurnbe users       3886 Feb 17  1996 pkgd.c
-r--r--r--   1 mwnurnbe users       1354 Mar  7  1996 pkge.c
-r--r--r--   1 mwnurnbe users       1354 Mar  7  1996 pkgf.c

femats/src/tcl7.5/win:
total 442
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:43 ./
drwxr-xr-x  10 mwnurnbe users       1024 Nov 27 09:43 ../
-r--r--r--   1 mwnurnbe users       3598 Apr 13  1996 README
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users       6432 Apr 19  1996 makefile.bc
-r--r--r--   1 mwnurnbe users       4996 Mar 27  1996 makefile.vc
-r--r--r--   1 mwnurnbe users        830 Apr 13  1996 tcl.rc
-r--r--r--   1 mwnurnbe users        859 Apr 13  1996 tcl16.rc
-r--r--r--   1 mwnurnbe users       4272 Mar 27  1996 tclAppInit.c
-r--r--r--   1 mwnurnbe users       4136 Jan  8  1996 tclWin16.c
-r--r--r--   1 mwnurnbe users       7475 Feb 14  1996 tclWin32Dll.c
-r--r--r--   1 mwnurnbe users      30760 Apr 13  1996 tclWinChan.c
-r--r--r--   1 mwnurnbe users      10063 Jan 17  1996 tclWinError.c
-r--r--r--   1 mwnurnbe users      19118 Apr 16  1996 tclWinFile.c
-r--r--r--   1 mwnurnbe users       6655 Mar 21  1996 tclWinInit.c
-r--r--r--   1 mwnurnbe users        572 Sep  5  1995 tclWinInt.h
-r--r--r--   1 mwnurnbe users       3244 Feb 17  1996 tclWinLoad.c
-r--r--r--   1 mwnurnbe users       1443 Feb 17  1996 tclWinMtherr.c
-r--r--r--   1 mwnurnbe users       6665 Feb 29  1996 tclWinNotify.c
-r--r--r--   1 mwnurnbe users      20555 Mar  8  1996 tclWinPipe.c
-r--r--r--   1 mwnurnbe users       8190 Mar 27  1996 tclWinPort.h
-r--r--r--   1 mwnurnbe users      42542 Apr 13  1996 tclWinSock.c
-r--r--r--   1 mwnurnbe users       8142 Feb  1  1996 tclWinStubs.c
-r--r--r--   1 mwnurnbe users       1070 Mar 27  1996 tclWinTest.c
-r--r--r--   1 mwnurnbe users       2691 Apr  8  1996 tclWinTime.c
-r--r--r--   1 mwnurnbe users       1350 Jan 17  1996 tclWinUtil.c
-r--r--r--   1 mwnurnbe users        922 Apr 13  1996 tclsh.rc
-r--r--r--   1 mwnurnbe users      12687 Apr 19  1996 winDumpExts.c

femats/src/tk4.1:
total 364
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-r--r--r--   1 mwnurnbe users      14117 Apr 11  1996 README
-r--r--r--   1 mwnurnbe users       3832 Feb 16  1996 ToDo
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 bitmaps/
-r--r--r--   1 mwnurnbe users     139210 Apr 18  1996 changes
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 compat/
drwxr-xr-x   2 mwnurnbe users       3072 Nov 27 09:47 doc/
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:47 generic/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 library/
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 mac/
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:47 tests/
drwxr-xr-x   2 mwnurnbe users       3072 Nov 27 09:55 unix/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 win/
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 xlib/

femats/src/tk4.1/bitmaps:
total 22
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-rw-r--r--   1 mwnurnbe users        407 Apr 21  1996 error.bmp
```

```
-rw-r--r--   1 mwnurnbe users        290 Apr 21  1996 gray12.bmp
-rw-r--r--   1 mwnurnbe users        290 Apr 21  1996 gray25.bmp
-rw-r--r--   1 mwnurnbe users        290 Apr 21  1996 gray50.bmp
-rw-r--r--   1 mwnurnbe users        494 Apr 21  1996 hourglass.bmp
-rw-r--r--   1 mwnurnbe users        214 Apr 21  1996 info.bmp
-rw-r--r--   1 mwnurnbe users        512 Apr 21  1996 questhead.bmp
-rw-r--r--   1 mwnurnbe users        602 Apr 21  1996 question.bmp
-rw-r--r--   1 mwnurnbe users        211 Apr 21  1996 warning.bmp

femats/src/tk4.1/compat:
total 20
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users       1710 Feb 17  1996 stdlib.h
-r--r--r--   1 mwnurnbe users       3287 Feb 17  1996 unistd.h

femats/src/tk4.1/doc:
total 1884
drwxr-xr-x   2 mwnurnbe users       3072 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users      12158 Mar 27  1996 3DBorder.3
-r--r--r--   1 mwnurnbe users       6673 Mar 27  1996 BindTable.3
-r--r--r--   1 mwnurnbe users       4761 Mar 27  1996 CanvPsY.3
-r--r--r--   1 mwnurnbe users       6534 Feb 16  1996 CanvTkwin.3
-r--r--r--   1 mwnurnbe users       4287 Mar 27  1996 CanvTxtInfo.3
-r--r--r--   1 mwnurnbe users       3029 Mar 27  1996 Clipboard.3
-r--r--r--   1 mwnurnbe users       1256 Mar 27  1996 ClrSelect.3
-r--r--r--   1 mwnurnbe users      28623 Mar 27  1996 ConfigWidg.3
-r--r--r--   1 mwnurnbe users       6252 Mar 27  1996 ConfigWind.3
-r--r--r--   1 mwnurnbe users       1713 Mar 27  1996 CoordToWin.3
-r--r--r--   1 mwnurnbe users       6273 Mar 27  1996 CrtErrHdlr.3
-r--r--r--   1 mwnurnbe users       3357 Mar 27  1996 CrtGenHdlr.3
-r--r--r--   1 mwnurnbe users       8638 Mar 27  1996 CrtImgType.3
-r--r--r--   1 mwnurnbe users      23907 Feb 16  1996 CrtItemType.3
-r--r--r--   1 mwnurnbe users      10050 Mar 21  1996 CrtPhImgFmt.3
-r--r--r--   1 mwnurnbe users       5262 Mar 27  1996 CrtSelHdlr.3
-r--r--r--   1 mwnurnbe users        890 Mar 27  1996 DeleteImg.3
-r--r--r--   1 mwnurnbe users       1144 Mar 27  1996 DrawFocHlt.3
-r--r--r--   1 mwnurnbe users       3028 Mar 14  1996 EventHndlr.3
-r--r--r--   1 mwnurnbe users       7824 Mar 21  1996 FindPhoto.3
-r--r--r--   1 mwnurnbe users       1910 Mar 27  1996 FreeXId.3
-r--r--r--   1 mwnurnbe users       2793 Mar 27  1996 GeomReq.3
-r--r--r--   1 mwnurnbe users       2250 Mar 27  1996 GetAnchor.3
-r--r--r--   1 mwnurnbe users       7433 Mar 14  1996 GetBitmap.3
-r--r--r--   1 mwnurnbe users       2019 Mar 27  1996 GetCapStyl.3
-r--r--r--   1 mwnurnbe users       2747 Mar 27  1996 GetClrmap.3
-r--r--r--   1 mwnurnbe users       5897 Mar 27  1996 GetColor.3
-r--r--r--   1 mwnurnbe users       8157 Apr 15  1996 GetCursor.3
-r--r--r--   1 mwnurnbe users       3007 Mar 27  1996 GetFontStr.3
-r--r--r--   1 mwnurnbe users       2814 Mar 27  1996 GetGC.3
-r--r--r--   1 mwnurnbe users       5035 Mar 27  1996 GetImage.3
-r--r--r--   1 mwnurnbe users       2033 Mar 27  1996 GetJoinStl.3
-r--r--r--   1 mwnurnbe users       2314 Mar 27  1996 GetJustify.3
-r--r--r--   1 mwnurnbe users       1436 Mar 27  1996 GetOption.3
-r--r--r--   1 mwnurnbe users       2457 Mar 27  1996 GetPixels.3
-r--r--r--   1 mwnurnbe users       1727 Mar 27  1996 GetPixmap.3
-r--r--r--   1 mwnurnbe users       1912 Mar 27  1996 GetRelief.3
-r--r--r--   1 mwnurnbe users       1383 Mar 27  1996 GetRootCrd.3
-r--r--r--   1 mwnurnbe users       2313 Mar 27  1996 GetScroll.3
-r--r--r--   1 mwnurnbe users       3101 Mar 27  1996 GetSelect.3
-r--r--r--   1 mwnurnbe users       1655 Mar 27  1996 GetUid.3
-r--r--r--   1 mwnurnbe users       1835 Mar 27  1996 GetVRoot.3
-r--r--r--   1 mwnurnbe users       3555 Mar 27  1996 GetVisual.3
-r--r--r--   1 mwnurnbe users       1646 Mar 27  1996 HandleEvent.3
-r--r--r--   1 mwnurnbe users        876 Mar 27  1996 IdToWindow.3
-r--r--r--   1 mwnurnbe users       2448 Mar 27  1996 ImgChanged.3
-r--r--r--   1 mwnurnbe users       1952 Mar 27  1996 InternAtom.3
-r--r--r--   1 mwnurnbe users        972 Mar 27  1996 MainLoop.3
-r--r--r--   1 mwnurnbe users        986 Mar 27  1996 MainWin.3
-r--r--r--   1 mwnurnbe users       4067 Mar 27  1996 MaintGeom.3
-r--r--r--   1 mwnurnbe users       3467 Mar 27  1996 ManageGeom.3
-r--r--r--   1 mwnurnbe users       1663 Mar 27  1996 MapWindow.3
-r--r--r--   1 mwnurnbe users       2181 Mar 27  1996 MoveToplev.3
-r--r--r--   1 mwnurnbe users       3388 Mar 27  1996 Name.3
-r--r--r--   1 mwnurnbe users        851 Mar 27  1996 NameOfImg.3
-r--r--r--   1 mwnurnbe users       1858 Mar 27  1996 OwnSelect.3
-r--r--r--   1 mwnurnbe users      14351 Mar 21  1996 ParseArgv.3
-r--r--r--   1 mwnurnbe users       1328 Mar 27  1996 QWinEvent.3
-r--r--r--   1 mwnurnbe users       1623 Mar 27  1996 Restack.3
-r--r--r--   1 mwnurnbe users       3581 Mar 27  1996 RestrictEv.3
-r--r--r--   1 mwnurnbe users       2373 Mar 27  1996 SetAppName.3
-r--r--r--   1 mwnurnbe users       2054 Mar 27  1996 SetClass.3
-r--r--r--   1 mwnurnbe users       2391 Mar 27  1996 SetGrid.3
-r--r--r--   1 mwnurnbe users       1826 Mar 27  1996 SetVisual.3
-r--r--r--   1 mwnurnbe users       1189 Mar 27  1996 StrictMotif.3
-r--r--r--   1 mwnurnbe users       1496 Mar 27  1996 Tk_Init.3
-r--r--r--   1 mwnurnbe users       2191 Mar 27  1996 Tk_Main.3
-r--r--r--   1 mwnurnbe users       4945 Mar 27  1996 WindowId.3
-r--r--r--   1 mwnurnbe users       1073 Mar 27  1996 bell.n
-r--r--r--   1 mwnurnbe users      18160 Mar 27  1996 bind.n
-r--r--r--   1 mwnurnbe users       3162 Mar 27  1996 bindtags.n
-r--r--r--   1 mwnurnbe users       4209 Mar 29  1996 bitmap.n
-r--r--r--   1 mwnurnbe users       6791 Mar 27  1996 button.n
-r--r--r--   1 mwnurnbe users      67881 Apr 15  1996 canvas.n
-r--r--r--   1 mwnurnbe users       9994 Mar 27  1996 checkbutton.n
-r--r--r--   1 mwnurnbe users       3524 Mar 27  1996 clipboard.n
-r--r--r--   1 mwnurnbe users        945 Mar 27  1996 destroy.n
-r--r--r--   1 mwnurnbe users       2127 Mar 27  1996 dialog.n
-r--r--r--   1 mwnurnbe users      17809 Mar  1  1996 entry.n
-r--r--r--   1 mwnurnbe users       4916 Mar 27  1996 focus.n
-r--r--r--   1 mwnurnbe users       2467 Mar 27  1996 focusNext.n
-r--r--r--   1 mwnurnbe users       4930 Mar 27  1996 frame.n
-r--r--r--   1 mwnurnbe users       5120 Mar 27  1996 grab.n
-r--r--r--   1 mwnurnbe users      10985 Mar 21  1996 grid.n
-r--r--r--   1 mwnurnbe users       3256 Mar 27  1996 image.n
-r--r--r--   1 mwnurnbe users       4165 Mar 27  1996 label.n
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users      19655 Mar 27  1996 listbox.n
-r--r--r--   1 mwnurnbe users       1268 Mar 27  1996 lower.n
-r--r--r--   1 mwnurnbe users       4741 Feb 17  1996 man.macros
-r--r--r--   1 mwnurnbe users      27173 Mar 27  1996 menu.n
-r--r--r--   1 mwnurnbe users       1114 Mar 27  1996 menubar.n
-r--r--r--   1 mwnurnbe users       8355 Mar 27  1996 menubutton.n
-r--r--r--   1 mwnurnbe users       6346 Mar 27  1996 message.n
-r--r--r--   1 mwnurnbe users       3622 Mar 27  1996 option.n
-r--r--r--   1 mwnurnbe users       1468 Mar 27  1996 optionMenu.n
-r--r--r--   1 mwnurnbe users      17587 Mar 14  1996 options.n
-r--r--r--   1 mwnurnbe users       7880 Mar 27  1996 pack-old.n
-r--r--r--   1 mwnurnbe users      10701 Mar 27  1996 pack.n
-r--r--r--   1 mwnurnbe users       3127 Mar 27  1996 palette.n
-r--r--r--   1 mwnurnbe users      16003 Mar 27  1996 photo.n
```

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-r--r--r--   1 mwnurnbe users      10371 Mar 27  1996 place.n
-r--r--r--   1 mwnurnbe users       1069 Mar 27  1996 popup.n
-r--r--r--   1 mwnurnbe users       9799 Mar 27  1996 radiobutton.n
-r--r--r--   1 mwnurnbe users       1268 Mar 27  1996 raise.n
-r--r--r--   1 mwnurnbe users      10766 Mar 14  1996 scale.n
-r--r--r--   1 mwnurnbe users      14434 Mar 27  1996 scrollbar.n
-r--r--r--   1 mwnurnbe users       6544 Mar 27  1996 selection.n
-r--r--r--   1 mwnurnbe users       3671 Mar 27  1996 send.n
-r--r--r--   1 mwnurnbe users      66540 Mar 27  1996 text.n
-r--r--r--   1 mwnurnbe users       1820 Mar 27  1996 tk.n
-rw-r--r--   1 mwnurnbe users     120919 Apr 21  1996 tk4.0.ps
-r--r--r--   1 mwnurnbe users       2727 Mar 27  1996 tkerror.n
-r--r--r--   1 mwnurnbe users       3017 Mar 12  1996 tkvars.n
-r--r--r--   1 mwnurnbe users       1879 Mar 27  1996 tkwait.n
-r--r--r--   1 mwnurnbe users       5503 Mar 27  1996 toplevel.n
-r--r--r--   1 mwnurnbe users      13538 Mar 27  1996 winfo.n
-r--r--r--   1 mwnurnbe users       7377 Mar 27  1996 wish.1
-r--r--r--   1 mwnurnbe users      25906 Mar  1  1996 wm.n

femats/src/tk4.1/generic:
total 5330
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users        243 Sep 11  1995 README
-r--r--r--   1 mwnurnbe users        652 Feb  9  1996 default.h
-r--r--r--   1 mwnurnbe users      21807 Jul 12  1995 ks_names.h
-r--r--r--   1 mwnurnbe users        912 Apr 12  1996 patchlevel.h
-r--r--r--   1 mwnurnbe users      52444 Mar 21  1996 tk.h
-r--r--r--   1 mwnurnbe users      38709 Feb 16  1996 tk3d.c
-r--r--r--   1 mwnurnbe users      11302 Feb 16  1996 tkArgv.c
-r--r--r--   1 mwnurnbe users       6159 Feb 16  1996 tkAtom.c
-r--r--r--   1 mwnurnbe users      74630 Mar 27  1996 tkBind.c
-r--r--r--   1 mwnurnbe users      16357 Feb 16  1996 tkBitmap.c
-r--r--r--   1 mwnurnbe users      61085 Mar  8  1996 tkButton.c
-r--r--r--   1 mwnurnbe users      52199 Feb 17  1996 tkCanvArc.c
-r--r--r--   1 mwnurnbe users      23229 Feb 17  1996 tkCanvBmap.c
-r--r--r--   1 mwnurnbe users      19317 Feb 17  1996 tkCanvImg.c
-r--r--r--   1 mwnurnbe users      48693 Feb 16  1996 tkCanvLine.c
-r--r--r--   1 mwnurnbe users      29229 Feb 16  1996 tkCanvPoly.c
-r--r--r--   1 mwnurnbe users      36720 Apr 12  1996 tkCanvPs.c
-r--r--r--   1 mwnurnbe users      48717 Feb 29  1996 tkCanvText.c
-r--r--r--   1 mwnurnbe users      10041 Feb 16  1996 tkCanvUtil.c
-r--r--r--   1 mwnurnbe users      24353 Feb 17  1996 tkCanvWind.c
-r--r--r--   1 mwnurnbe users     114321 Mar 27  1996 tkCanvas.c
-r--r--r--   1 mwnurnbe users       9700 Feb 16  1996 tkCanvas.h
-r--r--r--   1 mwnurnbe users      17810 Feb 16  1996 tkClipboard.c
-r--r--r--   1 mwnurnbe users      41591 Apr  8  1996 tkCmds.c
-r--r--r--   1 mwnurnbe users      22250 Mar 28  1996 tkColor.c
-r--r--r--   1 mwnurnbe users      27643 Feb 16  1996 tkConfig.c
-r--r--r--   1 mwnurnbe users      14990 Apr 21  1996 tkConsole.c
-r--r--r--   1 mwnurnbe users      11121 Feb 16  1996 tkCursor.c
-r--r--r--   1 mwnurnbe users      70526 Mar 27  1996 tkEntry.c
-r--r--r--   1 mwnurnbe users       9121 Feb 16  1996 tkError.c
-r--r--r--   1 mwnurnbe users      29778 Apr  8  1996 tkEvent.c
-r--r--r--   1 mwnurnbe users      23719 Feb 16  1996 tkFocus.c
-r--r--r--   1 mwnurnbe users      28399 Feb 16  1996 tkFont.c
-r--r--r--   1 mwnurnbe users      24671 Apr 19  1996 tkFrame.c
-r--r--r--   1 mwnurnbe users      10171 Feb 16  1996 tkGC.c
-r--r--r--   1 mwnurnbe users      17429 Feb 16  1996 tkGeometry.c
-r--r--r--   1 mwnurnbe users      14017 Feb 16  1996 tkGet.c
-r--r--r--   1 mwnurnbe users      47079 Feb 16  1996 tkGrab.c
-r--r--r--   1 mwnurnbe users      58484 Feb 22  1996 tkGrid.c
-r--r--r--   1 mwnurnbe users      22122 Mar  1  1996 tkImage.c
-r--r--r--   1 mwnurnbe users      30681 Feb 16  1996 tkImgBmap.c
-r--r--r--   1 mwnurnbe users      16730 Apr  9  1996 tkImgGIF.c
-r--r--r--   1 mwnurnbe users      11009 Mar 21  1996 tkImgPPM.c
-r--r--r--   1 mwnurnbe users     117999 Mar  8  1996 tkImgPhoto.c
-r--r--r--   1 mwnurnbe users       1913 Feb 16  1996 tkImgUtil.c
-r--r--r--   1 mwnurnbe users      29651 Mar 21  1996 tkInt.h
-r--r--r--   1 mwnurnbe users      68865 Apr  8  1996 tkListbox.c
-r--r--r--   1 mwnurnbe users      12057 Mar 27  1996 tkMain.c
-r--r--r--   1 mwnurnbe users      84700 Mar 27  1996 tkMenu.c
-r--r--r--   1 mwnurnbe users      39988 Feb 16  1996 tkMenubutton.c
-r--r--r--   1 mwnurnbe users      27331 Feb 16  1996 tkMessage.c
-r--r--r--   1 mwnurnbe users      38177 Feb 29  1996 tkOption.c
-r--r--r--   1 mwnurnbe users      50559 Feb 16  1996 tkPack.c
-r--r--r--   1 mwnurnbe users      30874 Feb 16  1996 tkPlace.c
-r--r--r--   1 mwnurnbe users        717 Feb 11  1996 tkPort.h
-r--r--r--   1 mwnurnbe users      31454 Mar  2  1996 tkRectOval.c
-r--r--r--   1 mwnurnbe users      64625 Mar 27  1996 tkScale.c
-r--r--r--   1 mwnurnbe users      39695 Feb 16  1996 tkScrollbar.c
-r--r--r--   1 mwnurnbe users      38525 Mar 27  1996 tkSelect.c
-r--r--r--   1 mwnurnbe users       6999 Nov  3  1995 tkSelect.h
-r--r--r--   1 mwnurnbe users      53731 Apr  8  1996 tkSend.c
-r--r--r--   1 mwnurnbe users      17421 Feb 16  1996 tkSquare.c
-r--r--r--   1 mwnurnbe users      33433 Mar 27  1996 tkTest.c
-r--r--r--   1 mwnurnbe users      66784 Apr 13  1996 tkText.c
-r--r--r--   1 mwnurnbe users      32367 Feb 16  1996 tkText.h
-r--r--r--   1 mwnurnbe users     103967 Mar 21  1996 tkTextBTree.c
-r--r--r--   1 mwnurnbe users     147119 Mar 27  1996 tkTextDisp.c
-r--r--r--   1 mwnurnbe users      20753 Feb 16  1996 tkTextIndex.c
-r--r--r--   1 mwnurnbe users      22435 Feb 16  1996 tkTextMark.c
-r--r--r--   1 mwnurnbe users      42139 Mar  7  1996 tkTextTag.c
-r--r--r--   1 mwnurnbe users      35466 Feb 16  1996 tkTextWind.c
-r--r--r--   1 mwnurnbe users      40084 Feb 16  1996 tkTrig.c
-r--r--r--   1 mwnurnbe users       4545 Feb 16  1996 tkUtil.c
-r--r--r--   1 mwnurnbe users      15977 Feb 16  1996 tkVisual.c
-r--r--r--   1 mwnurnbe users      68376 Apr  8  1996 tkWindow.c
-r--r--r--   1 mwnurnbe users      13984 Feb 29  1996 tkXId.c

femats/src/tk4.1/library:
total 324
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users       2173 Feb 16  1996 bgerror.tcl
-r--r--r--   1 mwnurnbe users       4547 Feb 20  1996 button.tcl
-r--r--r--   1 mwnurnbe users      10161 Mar  8  1996 console.tcl
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 demos/
-r--r--r--   1 mwnurnbe users       4262 Apr 10  1996 dialog.tcl
-r--r--r--   1 mwnurnbe users      14188 Apr 16  1996 entry.tcl
-r--r--r--   1 mwnurnbe users       4878 Feb 16  1996 focus.tcl
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users      11564 Apr 16  1996 listbox.tcl
-r--r--r--   1 mwnurnbe users      25237 Apr 16  1996 menu.tcl
-r--r--r--   1 mwnurnbe users        781 Feb 16  1996 obsolete.tcl
-r--r--r--   1 mwnurnbe users       1641 Feb 16  1996 optMenu.tcl
-r--r--r--   1 mwnurnbe users       7111 Feb 16  1996 palette.tcl
-r--r--r--   1 mwnurnbe users       9546 Feb 17  1996 prolog.ps
-r--r--r--   1 mwnurnbe users       6772 Apr 16  1996 scale.tcl
-r--r--r--   1 mwnurnbe users      11192 Apr 16  1996 scrlbar.tcl
-r--r--r--   1 mwnurnbe users       8491 Apr 11  1996 tclIndex
-r--r--r--   1 mwnurnbe users       3686 Feb 23  1996 tearoff.tcl
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-r--r--r--   1 mwnurnbe users      23115 Apr 16  1996 text.tcl
-r--r--r--   1 mwnurnbe users       3288 Feb 16  1996 tk.tcl

femats/src/tk4.1/library/demos:
total 496
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users       2123 Feb 16  1996 README
-r--r--r--   1 mwnurnbe users       7959 Apr 13  1996 arrow.tcl
-r--r--r--   1 mwnurnbe users       2964 Apr 13  1996 bind.tcl
-r--r--r--   1 mwnurnbe users       1491 Feb 16  1996 bitmap.tcl
-r--r--r--   1 mwnurnbe users       1594 Feb 16  1996 browse
-r--r--r--   1 mwnurnbe users       1214 Feb 16  1996 button.tcl
-r--r--r--   1 mwnurnbe users       1247 Feb 16  1996 check.tcl
-r--r--r--   1 mwnurnbe users       5071 Feb 16  1996 colors.tcl
-r--r--r--   1 mwnurnbe users       2690 Feb 16  1996 cscroll.tcl
-r--r--r--   1 mwnurnbe users       4997 Feb 16  1996 ctext.tcl
-r--r--r--   1 mwnurnbe users        709 Feb 16  1996 dialog1.tcl
-r--r--r--   1 mwnurnbe users        661 Feb 16  1996 dialog2.tcl
-r--r--r--   1 mwnurnbe users       1506 Feb 16  1996 entry1.tcl
-r--r--r--   1 mwnurnbe users       2232 Feb 16  1996 entry2.tcl
-r--r--r--   1 mwnurnbe users      78837 Feb 16  1996 floor.tcl
-r--r--r--   1 mwnurnbe users       1120 Feb 16  1996 form.tcl
-r--r--r--   1 mwnurnbe users        490 Feb 16  1996 hello
-r--r--r--   1 mwnurnbe users       1571 Feb 16  1996 hscale.tcl
-r--r--r--   1 mwnurnbe users       2084 Apr 13  1996 icon.tcl
-r--r--r--   1 mwnurnbe users        984 Apr 13  1996 image1.tcl
-r--r--r--   1 mwnurnbe users       2514 Apr 13  1996 image2.tcl
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 images/
-r--r--r--   1 mwnurnbe users       9590 Apr 13  1996 items.tcl
-r--r--r--   1 mwnurnbe users       7508 Feb 16  1996 ixset
-r--r--r--   1 mwnurnbe users       1340 Apr 13  1996 label.tcl
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users       5142 Apr 13  1996 menu.tcl
-r--r--r--   1 mwnurnbe users       2844 Feb 16  1996 plot.tcl
-r--r--r--   1 mwnurnbe users       2400 Feb 16  1996 puzzle.tcl
-r--r--r--   1 mwnurnbe users       1578 Feb 16  1996 radio.tcl
-r--r--r--   1 mwnurnbe users       5289 Feb 16  1996 rmt
-r--r--r--   1 mwnurnbe users       8130 Feb 16  1996 rolodex
-r--r--r--   1 mwnurnbe users       5238 Apr 13  1996 ruler.tcl
-r--r--r--   1 mwnurnbe users       2062 Feb 16  1996 sayings.tcl
-r--r--r--   1 mwnurnbe users       4474 Feb 16  1996 search.tcl
-r--r--r--   1 mwnurnbe users       1214 Feb 16  1996 square
-r--r--r--   1 mwnurnbe users       1743 Feb 16  1996 states.tcl
-r--r--r--   1 mwnurnbe users       6994 Feb 16  1996 style.tcl
-r--r--r--   1 mwnurnbe users       4068 Apr 13  1996 tclIndex
-r--r--r--   1 mwnurnbe users      11418 Feb 16  1996 tcolor
-r--r--r--   1 mwnurnbe users       3238 Feb 16  1996 text.tcl
-r--r--r--   1 mwnurnbe users        906 Feb 16  1996 timer
-r--r--r--   1 mwnurnbe users       6634 Feb 16  1996 twind.tcl
-r--r--r--   1 mwnurnbe users       1551 Feb 16  1996 vscale.tcl
-r--r--r--   1 mwnurnbe users       8357 Apr 13  1996 widget

femats/src/tk4.1/library/demos/images:
total 602
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users      51712 Apr 21  1996 earth.gif
-r--r--r--   1 mwnurnbe users       6343 Apr 21  1996 earthris.gif
-r--r--r--   1 mwnurnbe users      12720 Apr 21  1996 face.bmp
-r--r--r--   1 mwnurnbe users       1886 Apr 21  1996 flagdown.bmp
-r--r--r--   1 mwnurnbe users       1880 Apr 21  1996 flagup.bmp
-r--r--r--   1 mwnurnbe users        275 Apr 21  1996 gray25.bmp
-r--r--r--   1 mwnurnbe users       1883 Apr 21  1996 letters.bmp
-r--r--r--   1 mwnurnbe users       9344 Apr 21  1996 mickey.gif
-r--r--r--   1 mwnurnbe users       1889 Apr 21  1996 noletter.bmp
-r--r--r--   1 mwnurnbe users        272 Apr 21  1996 pattern.bmp
-r--r--r--   1 mwnurnbe users     196623 Apr 21  1996 teapot.ppm

femats/src/tk4.1/mac:
total 1192
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users        973 Mar  6  1996 MW_TkHeader.h
-r--r--r--   1 mwnurnbe users       7525 Apr 21  1996 README
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users       7511 Apr 10  1996 tkMacAppInit.c
-r--r--r--   1 mwnurnbe users      19384 Feb 16  1996 tkMacClipboard.c
-r--r--r--   1 mwnurnbe users      18203 Feb 16  1996 tkMacColor.c
-r--r--r--   1 mwnurnbe users       5955 Feb 16  1996 tkMacCursor.c
-r--r--r--   1 mwnurnbe users       4302 Jan 26  1996 tkMacCursors.r
-r--r--r--   1 mwnurnbe users      14236 Jan 26  1996 tkMacDefault.h
-r--r--r--   1 mwnurnbe users      24421 Feb 16  1996 tkMacDraw.c
-r--r--r--   1 mwnurnbe users      47268 Apr 10  1996 tkMacFont.c
-r--r--r--   1 mwnurnbe users       9613 Feb 23  1996 tkMacHLEvents.c
-r--r--r--   1 mwnurnbe users       3573 Apr 10  1996 tkMacInit.c
-r--r--r--   1 mwnurnbe users       4347 Mar 27  1996 tkMacInt.h
-r--r--r--   1 mwnurnbe users       7790 Feb 16  1996 tkMacKeyboard.c
-r--r--r--   1 mwnurnbe users       7958 Mar  8  1996 tkMacMenus.c
-r--r--r--   1 mwnurnbe users       2848 Apr 13  1996 tkMacPort.h
-rw-r--r--   1 mwnurnbe users      86573 Apr 21  1996 tkMacProjects.sit.hqx
-r--r--r--   1 mwnurnbe users       4624 Feb 16  1996 tkMacRegion.c
-r--r--r--   1 mwnurnbe users       5324 Apr 12  1996 tkMacResource.r
-r--r--r--   1 mwnurnbe users      51891 Apr 21  1996 tkMacScrollbar.c
-r--r--r--   1 mwnurnbe users      12828 Feb 16  1996 tkMacSend.c
-r--r--r--   1 mwnurnbe users      26902 Mar  8  1996 tkMacSubwindows.c
-r--r--r--   1 mwnurnbe users      36331 Apr 10  1996 tkMacWindowMgr.c
-r--r--r--   1 mwnurnbe users     120699 Apr 10  1996 tkMacWm.c
-r--r--r--   1 mwnurnbe users      33433 Jan 15  1996 tkMacXCursors.r
-r--r--r--   1 mwnurnbe users      19810 Feb 16  1996 tkMacXStubs.c

femats/src/tk4.1/tests:
total 1684
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users       1250 Mar 27  1996 README
-r--r--r--   1 mwnurnbe users        355 Mar  5  1996 all
-r--r--r--   1 mwnurnbe users       4036 Feb 16  1996 arc.tcl
-r--r--r--   1 mwnurnbe users       1010 Apr 10  1996 bell.test
-r--r--r--   1 mwnurnbe users       4448 Feb 16  1996 bevel.tcl
-r--r--r--   1 mwnurnbe users      35195 Feb 16  1996 bind.test
-r--r--r--   1 mwnurnbe users       4627 Feb 16  1996 butGeom.tcl
-r--r--r--   1 mwnurnbe users      30102 Mar  8  1996 button.test
-r--r--r--   1 mwnurnbe users      12539 Mar  5  1996 canvImg.test
-r--r--r--   1 mwnurnbe users       1847 Feb 16  1996 canvPsArc.tcl
-r--r--r--   1 mwnurnbe users       2612 Feb 16  1996 canvPsBmap.tcl
-r--r--r--   1 mwnurnbe users       3300 Feb 16  1996 canvPsGrph.tcl
-r--r--r--   1 mwnurnbe users       4350 Feb 16  1996 canvPsText.tcl
-r--r--r--   1 mwnurnbe users      11902 Mar  5  1996 canvRect.test
-r--r--r--   1 mwnurnbe users       5809 Feb 16  1996 canvas.test
-r--r--r--   1 mwnurnbe users       8768 Feb 16  1996 clipboard.test
-r--r--r--   1 mwnurnbe users       2154 Feb 16  1996 cmap.tcl
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-r--r--r--   1 mwnurnbe users       1502 Mar 14  1996 cmds.test
-r--r--r--   1 mwnurnbe users       4634 Mar  2  1996 color.test
-r--r--r--   1 mwnurnbe users       8432 Mar 27  1996 defs
-r--r--r--   1 mwnurnbe users      37703 Mar  2  1996 entry.test
-r--r--r--   1 mwnurnbe users       2844 Feb 16  1996 event.test
-r--r--r--   1 mwnurnbe users      13275 Feb 16  1996 focus.test
-r--r--r--   1 mwnurnbe users       7191 Feb 16  1996 focusTcl.test
-r--r--r--   1 mwnurnbe users      16881 Feb 16  1996 frame.test
-r--r--r--   1 mwnurnbe users       7586 Feb 16  1996 geometry.test
-r--r--r--   1 mwnurnbe users      22846 Apr 18  1996 grid.test
-r--r--r--   1 mwnurnbe users       2710 Feb 29  1996 id.test
-r--r--r--   1 mwnurnbe users      11328 Mar  5  1996 image.test
-r--r--r--   1 mwnurnbe users      16852 Feb 16  1996 imgBmap.test
-r--r--r--   1 mwnurnbe users       6189 Mar  5  1996 imgPPM.test
-r--r--r--   1 mwnurnbe users      14434 Feb 16  1996 imgPhoto.test
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users      44691 Feb 16  1996 listbox.test
-r--r--r--   1 mwnurnbe users       5366 Mar 27  1996 menu.test
-r--r--r--   1 mwnurnbe users      12234 Feb 16  1996 menubut.test
-r--r--r--   1 mwnurnbe users      19497 Feb 24  1996 oldpack.test
-r--r--r--   1 mwnurnbe users        362 Jul 12  1995 option.file1
-r--r--r--   1 mwnurnbe users         34 Jul 12  1995 option.file2
-r--r--r--   1 mwnurnbe users      10695 Mar  5  1996 option.test
-r--r--r--   1 mwnurnbe users      35491 Feb 16  1996 pack.test
-r--r--r--   1 mwnurnbe users       6945 Feb 16  1996 place.test
-r--r--r--   1 mwnurnbe users       8545 Feb 16  1996 raise.test
-r--r--r--   1 mwnurnbe users      24755 Feb 16  1996 scale.test
-r--r--r--   1 mwnurnbe users      15599 Feb 16  1996 scrollbar.test
-r--r--r--   1 mwnurnbe users      33300 Feb 16  1996 select.test
-r--r--r--   1 mwnurnbe users      20011 Mar 27  1996 send.test
-r--r--r--   1 mwnurnbe users      39437 Apr 13  1996 text.test
-r--r--r--   1 mwnurnbe users      27459 Mar 21  1996 textBTree.test
-r--r--r--   1 mwnurnbe users      92129 Feb 16  1996 textDisp.test
-r--r--r--   1 mwnurnbe users       9891 Feb 16  1996 textIndex.test
-r--r--r--   1 mwnurnbe users       6825 Feb 16  1996 textMark.test
-r--r--r--   1 mwnurnbe users      25643 Mar  7  1996 textTag.test
-r--r--r--   1 mwnurnbe users      28962 Feb 16  1996 textWind.test
-r--r--r--   1 mwnurnbe users       2333 Feb 16  1996 util.test
-r--r--r--   1 mwnurnbe users       3082 Feb 16  1996 visual
-r--r--r--   1 mwnurnbe users       9501 Feb 16  1996 visual.test
-r--r--r--   1 mwnurnbe users       2006 Feb 16  1996 window.test
-r--r--r--   1 mwnurnbe users      10862 Feb 16  1996 winfo.test
-r--r--r--   1 mwnurnbe users      20275 Mar  1  1996 wm.test

femats/src/tk4.1/unix:
total 6252
drwxr-xr-x   2 mwnurnbe users       3072 Nov 27 09:55 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-rw-r--r--   1 mwnurnbe users      26217 Nov 27 09:47 Makefile
-rw-r--r--   1 mwnurnbe users      26079 Apr 21  1996 Makefile.in
-rw-r--r--   1 mwnurnbe users      26217 Nov 27 09:47 Makefile.orig
-r--r--r--   1 mwnurnbe users       6582 Apr 21  1996 README
-rw-r--r--   1 mwnurnbe users       1805 Nov 27 09:47 config.cache
-rw-r--r--   1 mwnurnbe users        305 Nov 27 09:47 config.log
-rwxr-xr-x   1 mwnurnbe users       4361 Nov 27 09:47 config.status*
-rwxr-xr-x   1 mwnurnbe users      61959 Apr 21  1996 configure*
-rwxr-xr-x   1 mwnurnbe users      11598 Apr 21  1996 configure.in*
-r-xr-xr-x   1 mwnurnbe users       2186 Apr 21  1996 install-sh*
-rw-r--r--   1 mwnurnbe users     825792 Nov 27 09:54 libtk4.1.a
-r--r--r--   1 mwnurnbe users       1734 Apr 21  1996 license.terms
-rwxr-xr-x   1 mwnurnbe users      21435 Apr 21  1996 mkLinks*
-r--r--r--   1 mwnurnbe users       3904 Apr 21  1996 porting.notes
-r--r--r--   1 mwnurnbe users      11512 Apr 21  1996 porting.old
-rw-r--r--   1 mwnurnbe users      10548 Nov 27 09:48 tk3d.o
-r--r--r--   1 mwnurnbe users       3226 Mar 27  1996 tkAppInit.c
-rw-r--r--   1 mwnurnbe users       1332 Nov 27 09:47 tkAppInit.o
-rw-r--r--   1 mwnurnbe users       3976 Nov 27 09:48 tkArgv.o
-rw-r--r--   1 mwnurnbe users       3340 Nov 27 09:48 tkAtom.o
-rw-r--r--   1 mwnurnbe users      17584 Nov 27 09:48 tkBind.o
-rw-r--r--   1 mwnurnbe users       5572 Nov 27 09:48 tkBitmap.o
-rw-r--r--   1 mwnurnbe users      19816 Nov 27 09:51 tkButton.o
-rw-r--r--   1 mwnurnbe users      17272 Nov 27 09:52 tkCanvArc.o
-rw-r--r--   1 mwnurnbe users       7668 Nov 27 09:52 tkCanvBmap.o
-rw-r--r--   1 mwnurnbe users       5936 Nov 27 09:52 tkCanvImg.o
-rw-r--r--   1 mwnurnbe users      13768 Nov 27 09:52 tkCanvLine.o
-rw-r--r--   1 mwnurnbe users       8448 Nov 27 09:52 tkCanvPoly.o
-rw-r--r--   1 mwnurnbe users      12740 Nov 27 09:52 tkCanvPs.o
-rw-r--r--   1 mwnurnbe users      13600 Nov 27 09:52 tkCanvText.o
-rw-r--r--   1 mwnurnbe users       3500 Nov 27 09:52 tkCanvUtil.o
-rw-r--r--   1 mwnurnbe users       7100 Nov 27 09:53 tkCanvWind.o
-rw-r--r--   1 mwnurnbe users      39320 Nov 27 09:52 tkCanvas.o
-rw-r--r--   1 mwnurnbe users       5228 Nov 27 09:48 tkClipboard.o
-rw-r--r--   1 mwnurnbe users      21388 Nov 27 09:48 tkCmds.o
-rw-r--r--   1 mwnurnbe users       5864 Nov 27 09:48 tkColor.o
-rw-r--r--   1 mwnurnbe users       9696 Nov 27 09:48 tkConfig.o
-rw-r--r--   1 mwnurnbe users       1737 Nov 27 09:47 tkConfig.sh
-r--r--r--   1 mwnurnbe users       1658 Apr 21  1996 tkConfig.sh.in
-rw-r--r--   1 mwnurnbe users       3560 Nov 27 09:48 tkCursor.o
-rw-r--r--   1 mwnurnbe users      22144 Nov 27 09:51 tkEntry.o
-rw-r--r--   1 mwnurnbe users       2164 Nov 27 09:49 tkError.o
-rw-r--r--   1 mwnurnbe users       7156 Nov 27 09:49 tkEvent.o
-rw-r--r--   1 mwnurnbe users       5968 Nov 27 09:49 tkFocus.o
-rw-r--r--   1 mwnurnbe users       7252 Nov 27 09:49 tkFont.o
-rw-r--r--   1 mwnurnbe users       8768 Nov 27 09:51 tkFrame.o
-rw-r--r--   1 mwnurnbe users       2964 Nov 27 09:49 tkGC.o
-rw-r--r--   1 mwnurnbe users       4296 Nov 27 09:49 tkGeometry.o
-rw-r--r--   1 mwnurnbe users       6328 Nov 27 09:49 tkGet.o
-rw-r--r--   1 mwnurnbe users      10176 Nov 27 09:49 tkGrab.o
-rw-r--r--   1 mwnurnbe users      21924 Nov 27 09:49 tkGrid.o
-rw-r--r--   1 mwnurnbe users       6620 Nov 27 09:53 tkImage.o
-rw-r--r--   1 mwnurnbe users       9276 Nov 27 09:53 tkImgBmap.o
-rw-r--r--   1 mwnurnbe users       7200 Nov 27 09:53 tkImgGIF.o
-rw-r--r--   1 mwnurnbe users       4496 Nov 27 09:53 tkImgPPM.o
-rw-r--r--   1 mwnurnbe users      33148 Nov 27 09:53 tkImgPhoto.o
-rw-r--r--   1 mwnurnbe users      22636 Nov 27 09:51 tkListbox.o
-rw-r--r--   1 mwnurnbe users       4744 Nov 27 09:49 tkMain.o
-rw-r--r--   1 mwnurnbe users      25388 Nov 27 09:51 tkMenu.o
-rw-r--r--   1 mwnurnbe users      13560 Nov 27 09:51 tkMenubutton.o
-rw-r--r--   1 mwnurnbe users       9520 Nov 27 09:51 tkMessage.o
-rw-r--r--   1 mwnurnbe users       9680 Nov 27 09:49 tkOption.o
-rw-r--r--   1 mwnurnbe users      15780 Nov 27 09:50 tkPack.o
-rw-r--r--   1 mwnurnbe users      10664 Nov 27 09:50 tkPlace.o
-rw-r--r--   1 mwnurnbe users       9404 Nov 27 09:53 tkRectOval.o
-rw-r--r--   1 mwnurnbe users      20192 Nov 27 09:52 tkScale.o
-rw-r--r--   1 mwnurnbe users      13036 Nov 27 09:52 tkScrollbar.o
-rw-r--r--   1 mwnurnbe users      11324 Nov 27 09:50 tkSelect.o
-rw-r--r--   1 mwnurnbe users      14020 Nov 27 09:50 tkSend.o
-rw-r--r--   1 mwnurnbe users      26368 Nov 27 09:53 tkText.o
-rw-r--r--   1 mwnurnbe users      22516 Nov 27 09:54 tkTextBTree.o
-rw-r--r--   1 mwnurnbe users      31824 Nov 27 09:54 tkTextDisp.o
-rw-r--r--   1 mwnurnbe users       6560 Nov 27 09:54 tkTextIndex.o
-rw-r--r--   1 mwnurnbe users       7264 Nov 27 09:54 tkTextMark.o
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-rw-r--r--   1 mwnurnbe users      14052 Nov 27 09:54 tkTextTag.o
-rw-r--r--   1 mwnurnbe users      10556 Nov 27 09:54 tkTextWind.o
-rw-r--r--   1 mwnurnbe users      12584 Nov 27 09:53 tkTrig.o
-r--r--r--   1 mwnurnbe users       2136 Feb 16  1996 tkUnix.c
-rw-r--r--   1 mwnurnbe users       1112 Nov 27 09:50 tkUnix.o
-r--r--r--   1 mwnurnbe users      11677 Feb 16  1996 tkUnixCursor.c
-rw-r--r--   1 mwnurnbe users       5708 Nov 27 09:50 tkUnixCursor.o
-r--r--r--   1 mwnurnbe users      14242 Feb 16  1996 tkUnixDefault.h
-r--r--r--   1 mwnurnbe users       4959 Feb 16  1996 tkUnixDraw.c
-rw-r--r--   1 mwnurnbe users       1576 Nov 27 09:50 tkUnixDraw.o
-r--r--r--   1 mwnurnbe users       5197 Feb 16  1996 tkUnixEvent.c
-rw-r--r--   1 mwnurnbe users       2048 Nov 27 09:50 tkUnixEvent.o
-r--r--r--   1 mwnurnbe users       2648 Apr 11  1996 tkUnixInit.c
-rw-r--r--   1 mwnurnbe users       2084 Nov 27 09:50 tkUnixInit.o
-r--r--r--   1 mwnurnbe users        620 Dec 19  1995 tkUnixInt.h
-r--r--r--   1 mwnurnbe users       3247 Mar 14  1996 tkUnixPort.h
-r--r--r--   1 mwnurnbe users      34150 Apr  8  1996 tkUnixSelect.c
-rw-r--r--   1 mwnurnbe users       9208 Nov 27 09:50 tkUnixSelect.o
-r--r--r--   1 mwnurnbe users     124390 Apr  8  1996 tkUnixWm.c
-rw-r--r--   1 mwnurnbe users      35792 Nov 27 09:51 tkUnixWm.o
-rw-r--r--   1 mwnurnbe users       2004 Nov 27 09:50 tkUtil.o
-rw-r--r--   1 mwnurnbe users       4648 Nov 27 09:50 tkVisual.o
-rw-r--r--   1 mwnurnbe users      23336 Nov 27 09:50 tkWindow.o
-rw-r--r--   1 mwnurnbe users       2996 Nov 27 09:50 tkXId.o
-rwxr-xr-x   1 mwnurnbe users    1073152 Nov 27 09:54 wish*

femats/src/tk4.1/win:
total 630
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users       3672 Apr 13  1996 README
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users       6539 Apr 19  1996 makefile.bc
-r--r--r--   1 mwnurnbe users       5233 Apr 13  1996 makefile.vc
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:47 rc/
-r--r--r--   1 mwnurnbe users       7411 Apr 13  1996 stubs.c
-r--r--r--   1 mwnurnbe users       1854 Apr  8  1996 tkWin32Dll.c
-r--r--r--   1 mwnurnbe users       6711 Feb 16  1996 tkWinClipboard.c
-r--r--r--   1 mwnurnbe users      15612 Mar  8  1996 tkWinColor.c
-r--r--r--   1 mwnurnbe users       5346 Feb 16  1996 tkWinCursor.c
-r--r--r--   1 mwnurnbe users      14261 Sep 26  1995 tkWinDefault.h
-r--r--r--   1 mwnurnbe users      32541 Mar  8  1996 tkWinDraw.c
-r--r--r--   1 mwnurnbe users      17055 Apr  8  1996 tkWinFont.c
-r--r--r--   1 mwnurnbe users       2897 Feb 16  1996 tkWinImage.c
-r--r--r--   1 mwnurnbe users       2417 Mar 21  1996 tkWinInit.c
-r--r--r--   1 mwnurnbe users       4307 Apr 13  1996 tkWinInt.h
-r--r--r--   1 mwnurnbe users       7106 Feb 16  1996 tkWinKey.c
-r--r--r--   1 mwnurnbe users       2840 Mar  8  1996 tkWinPixmap.c
-r--r--r--   1 mwnurnbe users      20504 Feb 16  1996 tkWinPointer.c
-r--r--r--   1 mwnurnbe users       2073 Apr 13  1996 tkWinPort.h
-r--r--r--   1 mwnurnbe users       3737 Feb 16  1996 tkWinRegion.c
-r--r--r--   1 mwnurnbe users      12430 Apr 13  1996 tkWinWindow.c
-r--r--r--   1 mwnurnbe users      98164 Apr 17  1996 tkWinWm.c
-r--r--r--   1 mwnurnbe users      25796 Apr 13  1996 tkWinX.c
-r--r--r--   1 mwnurnbe users       5905 Apr 13  1996 winMain.c

femats/src/tk4.1/win/rc:
total 182
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:47 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor00.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor02.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor04.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor06.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor08.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor0a.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor0c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor0e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor10.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor12.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor14.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor16.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor18.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor1a.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor1c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor1e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor20.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor22.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor24.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor26.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor28.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor2a.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor2c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor2e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor30.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor32.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor34.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor36.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor38.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor3a.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor3c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor3e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor40.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor42.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor44.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor46.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor48.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor4a.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor4c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor4e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor50.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor52.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor54.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor56.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor58.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor5a.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor5c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor5e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor60.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor62.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor64.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor66.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor68.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor6a.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor6c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor6e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor70.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor72.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor74.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor76.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor78.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor7a.cur
```

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-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor7c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor7e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor80.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor82.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor84.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor86.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor88.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor8a.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor8c.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor8e.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor90.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor92.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor94.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor96.cur
-r--r--r--   1 mwnurnbe users        326 Apr 17  1996 cursor98.cur
-r--r--r--   1 mwnurnbe users       1398 Sep  5  1995 tk.ico
-r--r--r--   1 mwnurnbe users       5753 Apr 13  1996 tk.rc
-r--r--r--   1 mwnurnbe users       1398 Sep  5  1995 wish.ico
-r--r--r--   1 mwnurnbe users        901 Apr 13  1996 wish.rc

femats/src/tk4.1/xlib:
total 90
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x  12 mwnurnbe users       1024 Nov 27 09:47 ../
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 X11/
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms
-r--r--r--   1 mwnurnbe users       2247 Jul 12  1995 xbytes.h
-r--r--r--   1 mwnurnbe users      23324 Jul 12  1995 xcolors.h
-r--r--r--   1 mwnurnbe users       1740 Feb 16  1996 xdraw.c
-r--r--r--   1 mwnurnbe users       5097 Mar  8  1996 xgc.c
-r--r--r--   1 mwnurnbe users       2667 Feb 16  1996 ximage.c
-r--r--r--   1 mwnurnbe users       3182 Apr 10  1996 xutil.c

femats/src/tk4.1/xlib/X11:
total 432
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:47 ./
drwxr-xr-x   3 mwnurnbe users       1024 Nov 27 09:47 ../
-r--r--r--   1 mwnurnbe users      18382 Jul 12  1995 X.h
-r--r--r--   1 mwnurnbe users       2518 Jul 12  1995 Xatom.h
-r--r--r--   1 mwnurnbe users       1630 Jul 12  1995 Xfuncproto.h
-r--r--r--   1 mwnurnbe users     102570 Apr 10  1996 Xlib.h
-r--r--r--   1 mwnurnbe users      20738 Jul 12  1995 Xutil.h
-r--r--r--   1 mwnurnbe users       1953 Jul 12  1995 cursorfont.h
-r--r--r--   1 mwnurnbe users       1501 Jul 12  1995 keysym.h
-r--r--r--   1 mwnurnbe users      52254 Jul 12  1995 keysymdef.h
-r--r--r--   1 mwnurnbe users       1734 Jul 12  1995 license.terms

femats/src/xmgr-3.01pl7:
total 26
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:59 ./
drwxr-xr-x  13 mwnurnbe users       1024 Nov 27 10:03 ../
-rw-r--r--   1 mwnurnbe users        837 Oct 15  1995 COPYRIGHT
-rw-r--r--   1 mwnurnbe users        687 May 28  1995 INSTALL
-rw-r--r--   1 mwnurnbe users        417 May 28  1995 README
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 aux/
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:59 contrib/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 doc/
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:59 examples/
drwxr-xr-x   2 mwnurnbe users       3072 Nov 27 10:02 src/

femats/src/xmgr-3.01pl7/aux:
total 46
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:59 ../
-rw-r--r--   1 mwnurnbe users      13016 May 23  1993 cnvparm.c
-rw-r--r--   1 mwnurnbe users       3152 May 23  1993 greg2jul.c
-rw-r--r--   1 mwnurnbe users       3149 May 23  1993 jul2greg.c

femats/src/xmgr-3.01pl7/contrib:
total 16
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:59 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:59 ../
-rw-r--r--   1 mwnurnbe users        127 Jul  2  1994 README
-rw-r--r--   1 mwnurnbe users       2364 Apr 26  1992 README.EPS
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 npipe/
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 ps/

femats/src/xmgr-3.01pl7/contrib/npipe:
total 34
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:59 ../
-rw-r--r--   1 mwnurnbe users        112 Jul  1  1994 Makefile
-rw-r--r--   1 mwnurnbe users        428 Jul  1  1994 README
-rw-r--r--   1 mwnurnbe users       2448 Jun 17  1994 npipe.c
-rw-r--r--   1 mwnurnbe users       9446 Jun 17  1994 xmgrpipe.c

femats/src/xmgr-3.01pl7/contrib/ps:
total 1366
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 ./
drwxr-xr-x   4 mwnurnbe users       1024 Nov 27 09:59 ../
-rw-r--r--   1 mwnurnbe users      24881 Nov 30  1994 Cover.ps
-rw-r--r--   1 mwnurnbe users     148497 Nov 30  1994 TOC.ps
-rw-r--r--   1 mwnurnbe users     494420 Nov 30  1994 Users_Guide.ps

femats/src/xmgr-3.01pl7/doc:
total 370
drwxr-xr-x   2 mwnurnbe users       1024 Nov 27 09:59 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:59 ../
-rw-r--r--   1 mwnurnbe users      47196 May 29  1995 ACEgr.html
-rw-r--r--   1 mwnurnbe users      17344 May 28  1995 FAQ
-rw-r--r--   1 mwnurnbe users       7410 Oct 15  1995 README
-rw-r--r--   1 mwnurnbe users        484 May 28  1995 TODO
-rw-r--r--   1 mwnurnbe users      35230 Dec 18  1994 commands.html
-rw-r--r--   1 mwnurnbe users       4528 Dec 18  1994 graphops.html
-rw-r--r--   1 mwnurnbe users      21435 Dec 18  1994 graphs.html
-rw-r--r--   1 mwnurnbe users       4467 Dec 18  1994 main.html
-rw-r--r--   1 mwnurnbe users       1321 Dec 18  1994 page.html
-rw-r--r--   1 mwnurnbe users       3587 Dec 18  1994 points.html
-rw-r--r--   1 mwnurnbe users       3183 May 29  1995 regions.html
-rw-r--r--   1 mwnurnbe users       9485 Dec 18  1994 sets.html
-rw-r--r--   1 mwnurnbe users       6547 Jul  4  1994 status.html
-rw-r--r--   1 mwnurnbe users      11788 Jul  4  1994 trans.html
-rw-r--r--   1 mwnurnbe users       4279 Jul  4  1994 view.html

femats/src/xmgr-3.01pl7/examples:
total 3644
drwxr-xr-x   2 mwnurnbe users       2048 Nov 27 09:59 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:59 ../
-rw-r--r--   1 mwnurnbe users        106 Apr 12  1994 README
-rw-r--r--   1 mwnurnbe users        560 May 23  1993 altaxis.par
-rw-r--r--   1 mwnurnbe users        683 May 23  1993 anim.bat
-rw-r--r--   1 mwnurnbe users       1738 May 23  1993 animcos.par
```

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-rw-r--r--   1 mwnurnbe users      80598 May 23  1993 au.d
-rw-r--r--   1 mwnurnbe users      14716 Apr 17  1994 axes.par
-rw-r--r--   1 mwnurnbe users      13400 Nov  7  1993 bar.d
-rw-r--r--   1 mwnurnbe users      13232 May 23  1993 bar2.d
-rw-r--r--   1 mwnurnbe users      55876 May 23  1993 bars.d
-rw-r--r--   1 mwnurnbe users       1944 May 23  1993 brw.dat
-rw-r--r--   1 mwnurnbe users       7869 May 23  1993 btest.par
-rw-r--r--   1 mwnurnbe users      11901 May 23  1993 co2-2.par
-rw-r--r--   1 mwnurnbe users      58455 May 23  1993 co2-3.par
-rw-r--r--   1 mwnurnbe users      76905 May 23  1993 co2.all
-rw-r--r--   1 mwnurnbe users      23522 May 23  1993 co2.par
-rwxr--r--   1 mwnurnbe users       3025 Nov 26  1994 dotest*
-rw-r--r--   1 mwnurnbe users         71 May 23  1993 errbar.d
-rw-r--r--   1 mwnurnbe users         67 May 23  1993 errbar.d2
-rw-r--r--   1 mwnurnbe users         95 May 23  1993 errbar.d3
-rw-r--r--   1 mwnurnbe users      11381 May 23  1993 errbar.par
-rw-r--r--   1 mwnurnbe users      11959 May 23  1993 errbar1.par
-rw-r--r--   1 mwnurnbe users      24146 May 23  1993 errbar2.par
-rw-r--r--   1 mwnurnbe users      18617 Jul 17  1993 explain.par
-rw-r--r--   1 mwnurnbe users      60625 May 23  1993 fills.dat
-rw-r--r--   1 mwnurnbe users      68895 May 23  1993 graphs.par
-rw-r--r--   1 mwnurnbe users        206 May 23  1993 hilo.d
-rw-r--r--   1 mwnurnbe users      14730 May 23  1993 hilo.dat
-rw-r--r--   1 mwnurnbe users       4601 May 23  1993 log.d
-rw-r--r--   1 mwnurnbe users      16507 May 23  1993 logistic.d
-rw-r--r--   1 mwnurnbe users      18066 May 23  1993 logtest.par
-rw-r--r--   1 mwnurnbe users     430421 May 23  1993 manygraphs.d
-rw-r--r--   1 mwnurnbe users       1938 Aug  1  1994 mlo.dat
-rw-r--r--   1 mwnurnbe users      39207 May 23  1993 moresyms.dat
-rw-r--r--   1 mwnurnbe users      17452 May 23  1993 props1.par
-rw-r--r--   1 mwnurnbe users      14811 May 23  1993 regions.par
-rw-r--r--   1 mwnurnbe users        595 May 23  1993 setpat.d
-rw-r--r--   1 mwnurnbe users      50383 May 23  1993 slideshow.d
-rw-r--r--   1 mwnurnbe users      12038 May 23  1993 spec.par
-rw-r--r--   1 mwnurnbe users      14875 May 23  1993 stackedb.d
-rw-r--r--   1 mwnurnbe users      24258 May 23  1993 sym.par
-rw-r--r--   1 mwnurnbe users      25051 May 23  1993 syms.par
-rw-r--r--   1 mwnurnbe users      42843 May 23  1993 symslines.dat
-rw-r--r--   1 mwnurnbe users      14010 May 23  1993 tbar3.dat
-rw-r--r--   1 mwnurnbe users      17268 May 23  1993 terr.d
-rw-r--r--   1 mwnurnbe users      26557 May 23  1993 terr2.d
-rw-r--r--   1 mwnurnbe users       6503 May 23  1993 test.dat
-rw-r--r--   1 mwnurnbe users       9581 May 23  1993 test1.par
-rw-r--r--   1 mwnurnbe users      13938 May 23  1993 test2.d
-rw-r--r--   1 mwnurnbe users        442 May 23  1993 test2.dat
-rw-r--r--   1 mwnurnbe users      12460 May 23  1993 test2.par
-rw-r--r--   1 mwnurnbe users       6977 May 23  1993 tfonts.par
-rw-r--r--   1 mwnurnbe users      46547 May 23  1993 tforms.par
-rw-r--r--   1 mwnurnbe users      55608 May 28  1994 tgrid.nc
-rw-r--r--   1 mwnurnbe users     192063 May 23  1993 times.dat
-rw-r--r--   1 mwnurnbe users      31950 May 23  1993 tinset.d
-rw-r--r--   1 mwnurnbe users      37875 May 23  1993 tlog.demo
-rw-r--r--   1 mwnurnbe users       2262 May 23  1993 tmc.c
-rw-r--r--   1 mwnurnbe users      22020 Nov  7  1993 tstack.dat
-rw-r--r--   1 mwnurnbe users      18116 May 23  1993 txyr.dat
-rw-r--r--   1 mwnurnbe users       4390 May 23  1993 xyr.dat

femats/src/xmgr-3.01pl7/src:
total 9422
drwxr-xr-x   2 mwnurnbe users       3072 Nov 27 10:02 ./
drwxr-xr-x   7 mwnurnbe users       1024 Nov 27 09:59 ../
-rw-r--r--   1 mwnurnbe users       6462 Nov 25  1994 Imakefile
-rw-r--r--   1 mwnurnbe users      12694 Nov 27 09:59 Makefile
-rw-r--r--   1 mwnurnbe users      11900 Nov 27 09:59 Makefile.old
-rw-r--r--   1 mwnurnbe users      12149 Nov 27 09:59 Makefile.orig
-rw-r--r--   1 mwnurnbe users       1287 Jun 19  1993 XMgr.ad
-rw-r--r--   1 mwnurnbe users       2281 Dec 18  1993 bitmaps.h
-rw-r--r--   1 mwnurnbe users       2857 Mar 18  1995 blockwin.c
-rw-r--r--   1 mwnurnbe users       3880 Nov 27 09:59 blockwin.o
-rw-r--r--   1 mwnurnbe users       4355 May 12  1994 checkon.c
-rw-r--r--   1 mwnurnbe users       4292 Nov 27 10:01 checkon.o
-rw-r--r--   1 mwnurnbe users       6963 May 12  1994 chersh.c
-rw-r--r--   1 mwnurnbe users      62836 Nov 27 10:02 chersh.o
-rw-r--r--   1 mwnurnbe users       1542 May 12  1994 compute.c
-rw-r--r--   1 mwnurnbe users       2336 Nov 27 10:01 compute.o
-rw-r--r--   1 mwnurnbe users      29859 Jul 22  1994 computils.c
-rw-r--r--   1 mwnurnbe users      41540 Nov 27 10:01 computils.o
-rw-r--r--   1 mwnurnbe users      53955 Dec 18  1994 compwin.c
-rw-r--r--   1 mwnurnbe users      45932 Nov 27 10:00 compwin.o
-rw-r--r--   1 mwnurnbe users       9964 Mar 18  1995 comwin.c
-rw-r--r--   1 mwnurnbe users      11720 Nov 27 10:00 comwin.o
-rw-r--r--   1 mwnurnbe users      11370 Jun  6  1995 defaults.c
-rw-r--r--   1 mwnurnbe users      13612 Nov 27 10:01 defaults.o
-rw-r--r--   1 mwnurnbe users      21445 Jun  6  1995 defines.h
-rw-r--r--   1 mwnurnbe users      49956 Jun  7  1995 draw.c
-rw-r--r--   1 mwnurnbe users       4661 Jun  6  1995 draw.h
-rw-r--r--   1 mwnurnbe users      58136 Nov 27 10:02 draw.o
-rw-r--r--   1 mwnurnbe users      32201 May 28  1994 drawticks.c
-rw-r--r--   1 mwnurnbe users      34364 Nov 27 10:01 drawticks.o
-rw-r--r--   1 mwnurnbe users       4266 Dec 18  1994 drawwin.c
-rw-r--r--   1 mwnurnbe users       4732 Nov 27 09:59 drawwin.o
-rw-r--r--   1 mwnurnbe users      13853 Dec 18  1994 eblockwin.c
-rw-r--r--   1 mwnurnbe users      16144 Nov 27 09:59 eblockwin.o
-rw-r--r--   1 mwnurnbe users      11194 Dec 18  1994 editpwin.c
-rw-r--r--   1 mwnurnbe users       1440 Nov 27 10:00 editpwin.o
-rw-r--r--   1 mwnurnbe users      61759 Aug 10  1994 events.c
-rw-r--r--   1 mwnurnbe users      79388 Nov 27 09:59 events.o
-rw-r--r--   1 mwnurnbe users       1925 May 12  1994 externs.h
-rw-r--r--   1 mwnurnbe users       4138 Sep 14  1993 f2c.h
-rw-r--r--   1 mwnurnbe users      41955 Dec 21  1994 files.c
-rw-r--r--   1 mwnurnbe users      32712 Nov 27 10:01 files.o
-rw-r--r--   1 mwnurnbe users      23580 Mar 18  1995 fileswin.c
-rw-r--r--   1 mwnurnbe users      11544 Nov 27 09:59 fileswin.o
-rw-r--r--   1 mwnurnbe users      17335 May 12  1994 fit.c
-rw-r--r--   1 mwnurnbe users      18204 Nov 27 10:01 fit.o
-rw-r--r--   1 mwnurnbe users       3685 May 12  1994 fourier.c
-rw-r--r--   1 mwnurnbe users       3944 Nov 27 10:01 fourier.o
-rw-r--r--   1 mwnurnbe users       5378 Dec 18  1994 framewin.c
-rw-r--r--   1 mwnurnbe users       6004 Nov 27 10:01 framewin.o
-rw-r--r--   1 mwnurnbe users       2017 May 12  1994 getparms.c
-rw-r--r--   1 mwnurnbe users       2900 Nov 27 10:01 getparms.o
-rw-r--r--   1 mwnurnbe users      10370 Jul 18  1994 globals.h
-rw-r--r--   1 mwnurnbe users      27318 May 29  1995 graphutils.c
-rw-r--r--   1 mwnurnbe users      49172 Nov 27 10:01 graphutils.o
-rw-r--r--   1 mwnurnbe users      11673 Dec 18  1994 graphutils2.c
-rw-r--r--   1 mwnurnbe users      25460 Nov 27 10:01 graphutils2.o
-rw-r--r--   1 mwnurnbe users      25466 Mar 18  1995 graphwin.c
-rw-r--r--   1 mwnurnbe users      24084 Nov 27 10:00 graphwin.o
-rw-r--r--   1 mwnurnbe users       3241 Dec 18  1994 helpwin.c
-rw-r--r--   1 mwnurnbe users        572 Nov 27 10:01 helpwin.o
-rw-r--r--   1 mwnurnbe users     150054 Sep 14  1993 hersh.h
-rw-r--r--   1 mwnurnbe users       5942 Mar 18  1995 hotwin.c
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-rw-r--r--   1 mwnurnbe users       7688 Nov 27 10:00 hotwin.o
-rw-r--r--   1 mwnurnbe users       8507 May 12  1994 hp.c
-rw-r--r--   1 mwnurnbe users      11312 Nov 27 10:02 hp.o
-rw-r--r--   1 mwnurnbe users      17489 Dec  4  1993 image_f_io.c
-rw-r--r--   1 mwnurnbe users       8920 Nov 27 10:02 image_f_io.o
-rw-r--r--   1 mwnurnbe users       2087 May 12  1994 io.c
-rw-r--r--   1 mwnurnbe users       3240 Nov 27 10:01 io.o
-rw-r--r--   1 mwnurnbe users       8289 Dec 18  1994 labelwin.c
-rw-r--r--   1 mwnurnbe users       9612 Nov 27 10:01 labelwin.o
-rw-r--r--   1 mwnurnbe users      22095 May  5  1994 leaf.c
-rw-r--r--   1 mwnurnbe users      25200 Nov 27 10:02 leaf.o
-rw-r--r--   1 mwnurnbe users      61966 Aug  8  1994 lmdif1.c
-rw-r--r--   1 mwnurnbe users      28396 Nov 27 10:01 lmdif1.o
-rw-r--r--   1 mwnurnbe users       6620 Dec 18  1994 locatewin.c
-rw-r--r--   1 mwnurnbe users       9596 Nov 27 10:01 locatewin.o
-rw-r--r--   1 mwnurnbe users      33684 Oct 15  1995 main.c
-rw-r--r--   1 mwnurnbe users      39616 Nov 27 09:59 main.o
-rw-r--r--   1 mwnurnbe users       5225 Dec 18  1994 malerts.c
-rw-r--r--   1 mwnurnbe users       5676 Nov 27 09:59 malerts.o
-rw-r--r--   1 mwnurnbe users      16325 Jun  7  1994 mif.c
-rw-r--r--   1 mwnurnbe users      20332 Nov 27 10:02 mif.o
-rw-r--r--   1 mwnurnbe users       7604 Dec 18  1994 miscwin.c
-rw-r--r--   1 mwnurnbe users       8212 Nov 27 10:01 miscwin.o
-rw-r--r--   1 mwnurnbe users       5377 Dec 18  1994 monwin.c
-rw-r--r--   1 mwnurnbe users       6152 Nov 27 10:01 monwin.o
-rw-r--r--   1 mwnurnbe users        193 Sep 14  1993 motifinc.h
-rw-r--r--   1 mwnurnbe users      19142 Dec 18  1994 motifutils.c
-rw-r--r--   1 mwnurnbe users      19864 Nov 27 10:02 motifutils.o
-rw-r--r--   1 mwnurnbe users       9514 Dec 18  1994 nonlwin.c
-rw-r--r--   1 mwnurnbe users      10188 Nov 27 10:01 nonlwin.o
-rw-r--r--   1 mwnurnbe users      23691 May 27  1995 noxprotos.h
-rw-r--r--   1 mwnurnbe users       6609 May 27  1995 objutils.c
-rw-r--r--   1 mwnurnbe users      10704 Nov 27 10:01 objutils.o
-rw-r--r--   1 mwnurnbe users       3150 Dec 18  1994 pagewin.c
-rw-r--r--   1 mwnurnbe users       4004 Nov 27 10:01 pagewin.o
-rw-r--r--   1 mwnurnbe users      20463 Aug 17  1994 params.c
-rw-r--r--   1 mwnurnbe users      25080 Nov 27 10:01 params.o
-rw-r--r--   1 mwnurnbe users     335288 Jun  6  1995 pars.c
-rw-r--r--   1 mwnurnbe users       7193 Aug  5  1994 pars.h
-rw-r--r--   1 mwnurnbe users     171804 Nov 27 10:02 pars.o
-rw-r--r--   1 mwnurnbe users      87424 Jun  6  1995 pars.yacc
-rw-r--r--   1 mwnurnbe users         21 Jun  6  1995 patchlevel.h
-rw-r--r--   1 mwnurnbe users       4666 Dec 18  1993 patterns.h
-rw-r--r--   1 mwnurnbe users      43889 Jun  6  1995 plotone.c
-rw-r--r--   1 mwnurnbe users      57208 Nov 27 10:01 plotone.o
-rw-r--r--   1 mwnurnbe users       5909 Dec 18  1994 printwin.c
-rw-r--r--   1 mwnurnbe users       6992 Nov 27 09:59 printwin.o
-rw-r--r--   1 mwnurnbe users      21694 Mar 18  1995 ps.c
-rw-r--r--   1 mwnurnbe users      24296 Nov 27 10:02 ps.o
-rw-r--r--   1 mwnurnbe users      17652 Jul 30  1994 ps.org
-rw-r--r--   1 mwnurnbe users      17276 Dec 18  1994 ptswin.c
-rw-r--r--   1 mwnurnbe users      17680 Nov 27 10:00 ptswin.o
-rw-r--r--   1 mwnurnbe users      14536 Jul  8  1994 regionutils.c
-rw-r--r--   1 mwnurnbe users      22860 Nov 27 10:01 regionutils.o
-rw-r--r--   1 mwnurnbe users      16816 Dec 18  1994 regionwin.c
-rw-r--r--   1 mwnurnbe users      17316 Nov 27 10:00 regionwin.o
-rw-r--r--   1 mwnurnbe users       9967 May 12  1994 setprops.c
-rw-r--r--   1 mwnurnbe users      12012 Nov 27 10:01 setprops.o
-rw-r--r--   1 mwnurnbe users      45413 Feb  7  1995 setutils.c
-rw-r--r--   1 mwnurnbe users      72364 Nov 27 10:01 setutils.o
-rw-r--r--   1 mwnurnbe users      37765 Mar 18  1995 setwin.c
-rw-r--r--   1 mwnurnbe users      31932 Nov 27 10:00 setwin.o
-rw-r--r--   1 mwnurnbe users      12410 Sep 14  1993 special.h
-rw-r--r--   1 mwnurnbe users      35525 May 27  1995 statuswin.c
-rw-r--r--   1 mwnurnbe users      35892 Nov 27 10:00 statuswin.o
-rw-r--r--   1 mwnurnbe users      17140 Dec 18  1994 strwin.c
-rw-r--r--   1 mwnurnbe users      16440 Nov 27 10:00 strwin.o
-rw-r--r--   1 mwnurnbe users         60 Jul  3  1994 stubs.c
-rw-r--r--   1 mwnurnbe users        548 Nov 27 10:01 stubs.o
-rw-r--r--   1 mwnurnbe users       1486 Sep 14  1993 symdef.h
-rw-r--r--   1 mwnurnbe users       1271 Jan 16  1994 symdefs.h
-rw-r--r--   1 mwnurnbe users      38224 Jan 15  1995 symwin.c
-rw-r--r--   1 mwnurnbe users      38860 Nov 27 10:00 symwin.o
-rw-r--r--   1 mwnurnbe users      42807 Dec 18  1994 tickwin.c
-rw-r--r--   1 mwnurnbe users      39284 Nov 27 10:00 tickwin.o
-rw-r--r--   1 mwnurnbe users       7166 May 12  1994 utils.c
-rw-r--r--   1 mwnurnbe users       9528 Nov 27 10:01 utils.o
-rw-r--r--   1 mwnurnbe users      24686 Dec 18  1994 worldwin.c
-rw-r--r--   1 mwnurnbe users      27844 Nov 27 10:00 worldwin.o
-rwxr-xr-x   1 mwnurnbe users    1314816 Nov 27 10:02 xmgr*
-rw-r--r--   1 mwnurnbe users      48879 Dec 18  1994 xmgr.c
-rw-r--r--   1 mwnurnbe users      40248 Nov 27 09:59 xmgr.o
-rw-r--r--   1 mwnurnbe users       1898 Dec 18  1993 xmgr_icon.h
-rw-r--r--   1 mwnurnbe users      12031 Dec 18  1994 xprotos.h
-rw-r--r--   1 mwnurnbe users      21432 Jul 30  1994 xvlib.c
-rw-r--r--   1 mwnurnbe users      28184 Nov 27 10:02 xvlib.o
```

Appendix B

Mesh Processing Runtime Transcript

Following is a copy of the full transcript of the mesh processing that was performed in Section 2.4. This should be identical to what appeared in the status window show in Figure 2.8, and to the file /l/mwnurnbe/work/`almond/almond.preproc.log`.

Transcript of Almond Mesh Processing Run:

```
      Setting paths for tull...
femats.pre:  setting up preprocessor input data

femats.pre:  starting FEMATS pre-processing...
femats.pre:  performing file format conversion...

femats.u2c: processing I-DEAS VI format Universal file almond.unv...

 Name of universal file ?
  almond.unv
 There are 7120 nodes in the geometry.
 There are 38340 elements.
 There are 3 groups containing 2136 nodes.
 Max. volume = 7.36818E-04, Min. volume = 4.31950E-06
 Element with min. volume = 11702

 REFLECTION SPECIFICATIONS
 Does geometry mesh need to be reflected? 1) yes 2) no

 OUTER BOUNDARY SPECIFICATIONS

 Choose type of outer boundary used to terminate
 the mesh:
   1) spherical, 2) cylindrical, 3) rectangular box,
   4) mixed boundary
 Enter center coordinates (x,y,z) and radius:

u2c: done.

c2p: please be patient...this could take a while...

 Reading in data . . .
 Be patient . . .
 Starting surface node generation...
 Finished sorting surface edges and faces.
 Problem size ---
  There are 7120 nodes and 38340 elements
  Edge count =  46878
 5680 element faces/edges on the pec
 0 surface elements on resistive sheet
 0 surface elements on impedance sheet
 0 surface elements on dielectric
 0 surface elements on outer boundary
 1420 surface elements on integration surface

c2p: done.

count: processing data files.
count: please be patient...this could take a while...

  Average bandwidth  15

  Peak bandwidth  25

count: done.

femats.pre:  the following geometry data files have been created:

    almond.cntr, almond.edgy, almond.eglob,
    almond.enoddy, almond.esize, almond.esurfed,
    almond.geom

End of Script
```

End of Mesh Processing Transcript.

Appendix C

Solver Runtime Transcript

Following is a copy of the full transcript of the solver run that was performed in Section 2.7. This should be identical to what appeared in the status window show in Figure 2.12, and to the file /l/mwnurnbe/work/almond/almond.run.log.

Transcript of Almond Solver Run:

```
     Performing overflow checks on arrays...
 Prefix name of input files:
  almond

Done.
Starting FEMATS main processor...
 Prefix name of input data files:
  almond
 ************************************************
                Problem size
 Number of nodes = 7120
 Number of elements = 38340
 Number of edges/unknowns = 46878
 ************************************************
 No. of surface faces on
  1) PEC                              :  5680
  2) R-card                           :  0
  3) Impedance sheet                  :  0
  4) Dielectric interface             :  0
  5) Outer boundary (mesh term.)      :  0
  6) Far-field integration surface    :  1420
 ************************************************
 Outer boundary shape is
   Spherical
 ************************************************
 No. of dielectrics in target = 1
  Dielectric # 1
  Permittivity = (1.0,-2.7)
  Permeability = (1.0,-2.7)
 ************************************************
 Backscatter pattern will be computed
 Incident angle from 0 to 180
   in steps of 5
 Sweeping through phi; theta = 90
 Polarisation angle = 0
 ************************************************
 Reading in element/edge/node data . . .
 Time spent for unformatted I/O =  11.6171875 secs
 Time spent for I/O =  11.6640625 seconds
 ************************************************

 Generating finite element matrix . . .
 Outerloop --
    90.0000           .0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00970, time=    117.477s
  iter=  200, tol=  .00578, time=    233.773s
  iter=  300, tol=  .00502, time=    349.992s
  Convergence achieved in 357 iterations
  Time spent in 357 iterations = 416.29296875 seconds
Comput_results . . .
Monostatic angle = .0 for incidence of 0
Backscatter RCS = -26.3000471412892 dB

Monostatic angle = 1.0 for incidence of 0
Backscatter RCS = -26.3009456341887 dB

Monostatic angle = 2.0 for incidence of 0
Backscatter RCS = -26.3056124955554 dB

Writing to viz...
   90.0000          5.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00856, time=    116.219s
  iter=  200, tol=  .00588, time=    232.383s
  iter=  300, tol=  .00340, time=    349.043s
  Convergence achieved in 360 iterations
  Time spent in 360 iterations = 418.87109375 seconds
Comput_results . . .
Monostatic angle = 3.0 for incidence of 5
Backscatter RCS = -26.4692434965132 dB

Monostatic angle = 4.0 for incidence of 5
Backscatter RCS = -26.4649228573198 dB

Monostatic angle = 5.0 for incidence of 5
Backscatter RCS = -26.4646112083419 dB

Monostatic angle = 6.0 for incidence of 5
Backscatter RCS = -26.4686678013323 dB

Monostatic angle = 7.0 for incidence of 5
Backscatter RCS = -26.4776691114035 dB

Writing to viz...
   90.0000         10.0000           .0000
Gen_vector_soln . . .
```

```
Solver . . .
  iter=  100, tol=  .00628, time=    116.184s
  iter=  200, tol=  .02583, time=    232.516s
  iter=  300, tol=  .00829, time=    348.926s
  Convergence achieved in 362 iterations
  Time spent in 362 iterations = 421.37890625 seconds
Comput_results . . .
Monostatic angle = 8.0 for incidence of 10
Backscatter RCS = -26.4168634593179 dB

Monostatic angle = 9.0 for incidence of 10
Backscatter RCS = -26.4202774304471 dB

Monostatic angle = 10.0 for incidence of 10
Backscatter RCS = -26.4303891672741 dB

Monostatic angle = 11.0 for incidence of 10
Backscatter RCS = -26.4480611428788 dB

Monostatic angle = 12.0 for incidence of 10
Backscatter RCS = -26.4743956684663 dB

Writing to viz...
   90.0000         15.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00717, time=    116.238s
  iter=  200, tol=  .00340, time=    232.539s
  iter=  300, tol=  .01172, time=    349.145s
  Convergence achieved in 361 iterations
  Time spent in 361 iterations = 420.4140625 seconds
Comput_results . . .
Monostatic angle = 13.0 for incidence of 15
Backscatter RCS = -26.6220913402556 dB

Monostatic angle = 14.0 for incidence of 15
Backscatter RCS = -26.6406890241772 dB

Monostatic angle = 15.0 for incidence of 15
Backscatter RCS = -26.6696750123763 dB

Monostatic angle = 16.0 for incidence of 15
Backscatter RCS = -26.7105858171914 dB

Monostatic angle = 17.0 for incidence of 15
Backscatter RCS = -26.7652576853538 dB

Writing to viz...
   90.0000         20.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00322, time=    120.684s
  iter=  200, tol=  .02273, time=    238.059s
  iter=  300, tol=  .00557, time=    354.273s
  iter=  400, tol=  .00315, time=    470.473s
  Convergence achieved in 418 iterations
  Time spent in 418 iterations = 491.52734375 seconds
Comput_results . . .
Monostatic angle = 18.0 for incidence of 20
Backscatter RCS = -26.9161888132002 dB

Monostatic angle = 19.0 for incidence of 20
Backscatter RCS = -26.951021982404 dB

Monostatic angle = 20.0 for incidence of 20
Backscatter RCS = -27.0005602699926 dB

Monostatic angle = 21.0 for incidence of 20
Backscatter RCS = -27.067080542897 dB

Monostatic angle = 22.0 for incidence of 20
Backscatter RCS = -27.153242555999 dB

Writing to viz...
   90.0000         25.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .02594, time=    116.156s
  iter=  200, tol=  .00933, time=    232.309s
  Convergence achieved in 245 iterations
  Time spent in 245 iterations = 284.69140625 seconds
Comput_results . . .
Monostatic angle = 23.0 for incidence of 25
Backscatter RCS = -27.2380086448093 dB

Monostatic angle = 24.0 for incidence of 25
Backscatter RCS = -27.3382349378432 dB

Monostatic angle = 25.0 for incidence of 25
Backscatter RCS = -27.4625968430673 dB
```

```
Monostatic angle = 26.0 for incidence of 25
Backscatter RCS = -27.6141171695295 dB

Monostatic angle = 27.0 for incidence of 25
Backscatter RCS = -27.7961775778273 dB

Writing to viz...
   90.0000         30.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .01249, time=    117.434s
  iter=  200, tol=  .00791, time=    233.602s
  iter=  300, tol=  .00272, time=    349.793s
  iter=  400, tol=  .00061, time=    465.996s
  iter=  500, tol=  .00253, time=    582.230s
  Convergence achieved in 596 iterations
  Time spent in 596 iterations = 693.86328125 seconds
Comput_results . . .
Monostatic angle = 28.0 for incidence of 30
Backscatter RCS = -29.0042225335111 dB

Monostatic angle = 29.0 for incidence of 30
Backscatter RCS = -29.1878602744494 dB

Monostatic angle = 30.0 for incidence of 30
Backscatter RCS = -29.4102368544592 dB

Monostatic angle = 31.0 for incidence of 30
Backscatter RCS = -29.6759957374273 dB

Monostatic angle = 32.0 for incidence of 30
Backscatter RCS = -29.9899992618307 dB

Writing to viz...
   90.0000         35.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00520, time=    116.184s
  iter=  200, tol=  .00200, time=    232.406s
  iter=  300, tol=  .00813, time=    348.609s
  iter=  400, tol=  .00114, time=    464.918s
  iter=  500, tol=  .00080, time=    581.078s
  iter=  600, tol=  .00307, time=    697.266s
  Convergence achieved in 629 iterations
  Time spent in 629 iterations = 731.0546875 seconds
Comput_results . . .
Monostatic angle = 33.0 for incidence of 35
Backscatter RCS = -30.2425954517687 dB

Monostatic angle = 34.0 for incidence of 35
Backscatter RCS = -30.6301369706562 dB

Monostatic angle = 35.0 for incidence of 35
Backscatter RCS = -31.0839514255017 dB

Monostatic angle = 36.0 for incidence of 35
Backscatter RCS = -31.6101832275236 dB

Monostatic angle = 37.0 for incidence of 35
Backscatter RCS = -32.2119105932793 dB

Writing to viz...
   90.0000         40.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00207, time=    116.156s
  iter=  200, tol=  .00222, time=    232.410s
  iter=  300, tol=  .08821, time=    348.633s
  iter=  400, tol=  .00363, time=    464.801s
  iter=  500, tol=  .00097, time=    580.980s
  Convergence achieved in 595 iterations
  Time spent in 595 iterations = 691.53515625 seconds
Comput_results . . .
Monostatic angle = 38.0 for incidence of 40
Backscatter RCS = -31.454595502269 dB

Monostatic angle = 39.0 for incidence of 40
Backscatter RCS = -31.9484972545481 dB

Monostatic angle = 40.0 for incidence of 40
Backscatter RCS = -32.4878061489989 dB

Monostatic angle = 41.0 for incidence of 40
Backscatter RCS = -33.0473057805669 dB

Monostatic angle = 42.0 for incidence of 40
Backscatter RCS = -33.5749633373904 dB

Writing to viz...
```

```
   90.0000         45.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00267, time=    116.523s
  iter=  200, tol=  .00771, time=    232.742s
  iter=  300, tol=  .01328, time=    348.957s
  iter=  400, tol=  .00533, time=    465.113s
  Convergence achieved in 407 iterations
  Time spent in 407 iterations = 473.3515625 seconds
Comput_results . . .
Monostatic angle = 43.0 for incidence of 45
Backscatter RCS = -36.1670519414263 dB

Monostatic angle = 44.0 for incidence of 45
Backscatter RCS = -35.6746648134839 dB

Monostatic angle = 45.0 for incidence of 45
Backscatter RCS = -34.7629966870944 dB

Monostatic angle = 46.0 for incidence of 45
Backscatter RCS = -33.5641984119784 dB

Monostatic angle = 47.0 for incidence of 45
Backscatter RCS = -32.2260323221069 dB

Writing to viz...
   90.0000         50.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00628, time=    116.246s
  iter=  200, tol=  .00234, time=    232.434s
  iter=  300, tol=  .00124, time=    348.805s
  iter=  400, tol=  .00386, time=    464.992s
  Convergence achieved in 479 iterations
  Time spent in 479 iterations = 556.86328125 seconds
Comput_results . . .
Monostatic angle = 48.0 for incidence of 50
Backscatter RCS = -31.4341778905138 dB

Monostatic angle = 49.0 for incidence of 50
Backscatter RCS = -30.4104614869624 dB

Monostatic angle = 50.0 for incidence of 50
Backscatter RCS = -29.3484735210161 dB

Monostatic angle = 51.0 for incidence of 50
Backscatter RCS = -28.2804473293831 dB

Monostatic angle = 52.0 for incidence of 50
Backscatter RCS = -27.2279317318177 dB

Writing to viz...
   90.0000         55.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00194, time=    116.273s
  iter=  200, tol=  .01120, time=    232.492s
  iter=  300, tol=  .00247, time=    348.691s
  iter=  400, tol=  .00341, time=    464.875s
  iter=  500, tol=  .00211, time=    581.063s
  Convergence achieved in 513 iterations
  Time spent in 513 iterations = 596.26171875 seconds
Comput_results . . .
Monostatic angle = 53.0 for incidence of 55
Backscatter RCS = -26.1859893471965 dB

Monostatic angle = 54.0 for incidence of 55
Backscatter RCS = -25.2913170792122 dB

Monostatic angle = 55.0 for incidence of 55
Backscatter RCS = -24.4230407484761 dB

Monostatic angle = 56.0 for incidence of 55
Backscatter RCS = -23.5838096084781 dB

Monostatic angle = 57.0 for incidence of 55
Backscatter RCS = -22.7752752010134 dB

Writing to viz...
   90.0000         60.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00179, time=    116.215s
  iter=  200, tol=  .00905, time=    232.430s
  iter=  300, tol=  .00685, time=    348.625s
  iter=  400, tol=  .00560, time=    464.797s
  iter=  500, tol=  .00445, time=    580.984s
  Convergence achieved in 569 iterations
  Time spent in 569 iterations = 661.26953125 seconds
Comput_results . . .
```

```
Monostatic angle = 58.0 for incidence of 60
Backscatter RCS = -21.9159445311986 dB

Monostatic angle = 59.0 for incidence of 60
Backscatter RCS = -21.2158257041088 dB

Monostatic angle = 60.0 for incidence of 60
Backscatter RCS = -20.5385441447316 dB

Monostatic angle = 61.0 for incidence of 60
Backscatter RCS = -19.8853420922032 dB

Monostatic angle = 62.0 for incidence of 60
Backscatter RCS = -19.2571565292641 dB

Writing to viz...
   90.0000         65.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00419, time=    116.152s
  Convergence achieved in 182 iterations
  Time spent in 182 iterations = 211.53515625 seconds
Comput_results . . .
Monostatic angle = 63.0 for incidence of 65
Backscatter RCS = -19.05184348568 dB

Monostatic angle = 64.0 for incidence of 65
Backscatter RCS = -18.4764920813061 dB

Monostatic angle = 65.0 for incidence of 65
Backscatter RCS = -17.9216056466119 dB

Monostatic angle = 66.0 for incidence of 65
Backscatter RCS = -17.3884125394312 dB

Monostatic angle = 67.0 for incidence of 65
Backscatter RCS = -16.8779122374146 dB

Writing to viz...
   90.0000         70.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00533, time=    117.492s
  Convergence achieved in 194 iterations
  Time spent in 194 iterations = 226.796875 seconds
```



```
Comput_results . . .
Monostatic angle = 68.0 for incidence of 70
Backscatter RCS = -16.4389084277719 dB

Monostatic angle = 69.0 for incidence of 70
Backscatter RCS = -15.9936476240652 dB

Monostatic angle = 70.0 for incidence of 70
Backscatter RCS = -15.5682062508264 dB

Monostatic angle = 71.0 for incidence of 70
Backscatter RCS = -15.1633968859735 dB

Monostatic angle = 72.0 for incidence of 70
Backscatter RCS = -14.7799059352111 dB

Writing to viz...
   90.0000         75.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00492, time=    116.215s
  Convergence achieved in 190 iterations
  Time spent in 190 iterations = 220.828125 seconds
Comput_results . . .
Monostatic angle = 73.0 for incidence of 75
Backscatter RCS = -14.5250155935927 dB

Monostatic angle = 74.0 for incidence of 75
Backscatter RCS = -14.1850284524147 dB

Monostatic angle = 75.0 for incidence of 75
Backscatter RCS = -13.8647480882819 dB

Monostatic angle = 76.0 for incidence of 75
Backscatter RCS = -13.5648369125791 dB

Monostatic angle = 77.0 for incidence of 75
Backscatter RCS = -13.2858521390448 dB

Writing to viz...
   90.0000         80.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00272, time=    116.195s
  iter=  200, tol=  .00477, time=    232.410s
```

```
  Convergence achieved in 241 iterations
  Time spent in 241 iterations = 280.15234375 seconds
Comput_results . . .
Monostatic angle = 78.0 for incidence of 80
Backscatter RCS = -13.1647937794738 dB

Monostatic angle = 79.0 for incidence of 80
Backscatter RCS = -12.9526409081758 dB

Monostatic angle = 80.0 for incidence of 80
Backscatter RCS = -12.7587379166628 dB

Monostatic angle = 81.0 for incidence of 80
Backscatter RCS = -12.5835310778216 dB

Monostatic angle = 82.0 for incidence of 80
Backscatter RCS = -12.4273902525517 dB

Writing to viz...
   90.0000         85.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00258, time=    117.484s
  iter=  200, tol=  .00653, time=    233.680s
  iter=  300, tol=  .00155, time=    349.969s
  iter=  400, tol=  .01134, time=    466.332s
  iter=  500, tol=  .00064, time=    582.547s
  Convergence achieved in 584 iterations
  Time spent in 584 iterations = 680.36328125 seconds
Comput_results . . .
Monostatic angle = 83.0 for incidence of 85
Backscatter RCS = -12.1461251949922 dB

Monostatic angle = 84.0 for incidence of 85
Backscatter RCS = -12.0239411043538 dB

Monostatic angle = 85.0 for incidence of 85
Backscatter RCS = -11.9207917691786 dB

Monostatic angle = 86.0 for incidence of 85
Backscatter RCS = -11.8369303472766 dB

Monostatic angle = 87.0 for incidence of 85
Backscatter RCS = -11.7725344102449 dB

Writing to viz...
   90.0000         90.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00324, time=    116.211s
  iter=  200, tol=  .00668, time=    232.395s
  Convergence achieved in 241 iterations
  Time spent in 241 iterations = 280.18359375 seconds
Comput_results . . .
Monostatic angle = 88.0 for incidence of 90
Backscatter RCS = -11.8618716754304 dB

Monostatic angle = 89.0 for incidence of 90
Backscatter RCS = -11.8309973038123 dB

Monostatic angle = 90.0 for incidence of 90
Backscatter RCS = -11.8194000120095 dB

Monostatic angle = 91.0 for incidence of 90
Backscatter RCS = -11.8271352828569 dB

Monostatic angle = 92.0 for incidence of 90
Backscatter RCS = -11.8541928069051 dB

Writing to viz...
   90.0000         95.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00123, time=    117.473s
  iter=  200, tol=  .00405, time=    233.645s
  iter=  300, tol=  .00291, time=    349.809s
  iter=  400, tol=  .00541, time=    466.020s
  iter=  500, tol=  .00263, time=    582.277s
  Convergence achieved in 582 iterations
  Time spent in 582 iterations = 677.65625 seconds
Comput_results . . .
Monostatic angle = 93.0 for incidence of 95
Backscatter RCS = -11.7889474494505 dB

Monostatic angle = 94.0 for incidence of 95
Backscatter RCS = -11.8479203043962 dB

Monostatic angle = 95.0 for incidence of 95
Backscatter RCS = -11.9265998382854 dB
```

```
Monostatic angle = 96.0 for incidence of 95
Backscatter RCS = -12.0248688595482 dB

Monostatic angle = 97.0 for incidence of 95
Backscatter RCS = -12.1425361170245 dB

Writing to viz...
   90.0000        100.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00262, time=    116.227s
  iter=  200, tol=  .00377, time=    232.402s
  iter=  300, tol=  .00222, time=    348.566s
  iter=  400, tol=  .01316, time=    464.727s
  iter=  500, tol=  .00095, time=    580.906s
  Convergence achieved in 562 iterations
  Time spent in 562 iterations = 653.046875 seconds
Comput_results . . .
Monostatic angle = 98.0 for incidence of 100
Backscatter RCS = -12.2582772404709 dB

Monostatic angle = 99.0 for incidence of 100
Backscatter RCS = -12.4149987361188 dB

Monostatic angle = 100.0 for incidence of 100
Backscatter RCS = -12.5916398996101 dB

Monostatic angle = 101.0 for incidence of 100
Backscatter RCS = -12.7879229526632 dB

Monostatic angle = 102.0 for incidence of 100
Backscatter RCS = -13.0034984969066 dB

Writing to viz...
   90.0000        105.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00920, time=    116.148s
  iter=  200, tol=  .00313, time=    232.336s
  iter=  300, tol=  .02319, time=    349.047s
  iter=  400, tol=  .02022, time=    466.484s
  iter=  500, tol=  .00758, time=    582.746s
  Convergence achieved in 531 iterations
  Time spent in 531 iterations = 619.08984375 seconds
Comput_results . . .
```

```
Monostatic angle = 103.0 for incidence of 105
Backscatter RCS = -13.183481444538 dB

Monostatic angle = 104.0 for incidence of 105
Backscatter RCS = -13.4512802456244 dB

Monostatic angle = 105.0 for incidence of 105
Backscatter RCS = -13.7399546809961 dB

Monostatic angle = 106.0 for incidence of 105
Backscatter RCS = -14.0491625213121 dB

Monostatic angle = 107.0 for incidence of 105
Backscatter RCS = -14.3784948184117 dB

Writing to viz...
   90.0000        110.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00248, time=    116.320s
  iter=  200, tol=  .00410, time=    232.738s
  iter=  300, tol=  .00306, time=    349.844s
  iter=  400, tol=  .00459, time=    466.566s
  iter=  500, tol=  .00626, time=    583.230s
  Convergence achieved in 560 iterations
  Time spent in 560 iterations = 653.3359375 seconds
Comput_results . . .
Monostatic angle = 108.0 for incidence of 110
Backscatter RCS = -14.6769769416061 dB

Monostatic angle = 109.0 for incidence of 110
Backscatter RCS = -15.044025318449 dB

Monostatic angle = 110.0 for incidence of 110
Backscatter RCS = -15.4321921501193 dB

Monostatic angle = 111.0 for incidence of 110
Backscatter RCS = -15.8409747285719 dB

Monostatic angle = 112.0 for incidence of 110
Backscatter RCS = -16.2697911841222 dB

Writing to viz...
   90.0000        115.0000           .0000
Gen_vector_soln . . .
```

```
Solver . . .
  iter=  100, tol=  .00259, time=    117.785s
  iter=  200, tol=  .00345, time=    233.938s
  iter=  300, tol=  .01298, time=    350.277s
  Convergence achieved in 357 iterations
  Time spent in 357 iterations = 416.75 seconds
Comput_results . . .
Monostatic angle = 113.0 for incidence of 115
Backscatter RCS = -16.6575499736752 dB

Monostatic angle = 114.0 for incidence of 115
Backscatter RCS = -17.1484794007172 dB

Monostatic angle = 115.0 for incidence of 115
Backscatter RCS = -17.6608773397601 dB

Monostatic angle = 116.0 for incidence of 115
Backscatter RCS = -18.1938051689599 dB

Monostatic angle = 117.0 for incidence of 115
Backscatter RCS = -18.7460837026021 dB

Writing to viz...
   90.0000        120.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00412, time=    116.184s
  iter=  200, tol=  .00367, time=    232.367s
  iter=  300, tol=  .00172, time=    348.871s
  iter=  400, tol=  .00156, time=    465.289s
  iter=  500, tol=  .00148, time=    581.527s
  Convergence achieved in 512 iterations
  Time spent in 512 iterations = 595.57421875 seconds
Comput_results . . .
Monostatic angle = 118.0 for incidence of 120
Backscatter RCS = -19.3992189802134 dB

Monostatic angle = 119.0 for incidence of 120
Backscatter RCS = -20.0420434633347 dB

Monostatic angle = 120.0 for incidence of 120
Backscatter RCS = -20.7129940096736 dB

Monostatic angle = 121.0 for incidence of 120
Backscatter RCS = -21.4119919604912 dB

Monostatic angle = 122.0 for incidence of 120
Backscatter RCS = -22.1388935561411 dB

Writing to viz...
   90.0000        125.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .01163, time=    118.047s
  iter=  200, tol=  .00318, time=    234.418s
  iter=  300, tol=  .00087, time=    350.695s
  Convergence achieved in 302 iterations
  Time spent in 302 iterations = 353.12890625 seconds
Comput_results . . .
Monostatic angle = 122.0 for incidence of 124
Backscatter RCS = -21.6547766734657 dB

Monostatic angle = 123.0 for incidence of 124
Backscatter RCS = -22.4306238520457 dB

Monostatic angle = 124.0 for incidence of 124
Backscatter RCS = -23.2402885355738 dB

Monostatic angle = 125.0 for incidence of 124
Backscatter RCS = -24.0821713632714 dB

Monostatic angle = 126.0 for incidence of 124
Backscatter RCS = -24.9532943488907 dB

Writing to viz...
   90.0000        130.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00186, time=    116.441s
  iter=  200, tol=  .02795, time=    232.590s
  iter=  300, tol=  .00320, time=    348.750s
  Convergence achieved in 400 iterations
  Time spent in 400 iterations = 464.97265625 seconds
Comput_results . . .
Monostatic angle = 128.0 for incidence of 130
Backscatter RCS = -26.8521158449713 dB

Monostatic angle = 129.0 for incidence of 130
Backscatter RCS = -27.8214075810366 dB
```

```
Monostatic angle = 130.0 for incidence of 130
Backscatter RCS = -28.7724797486937 dB

Monostatic angle = 131.0 for incidence of 130
Backscatter RCS = -29.6740989138759 dB

Monostatic angle = 132.0 for incidence of 130
Backscatter RCS = -30.4872334395182 dB

Writing to viz...
   90.0000        135.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00198, time=    117.434s
  iter=  200, tol=  .09129, time=    233.629s
  iter=  300, tol=  .00814, time=    349.832s
  iter=  400, tol=  .00262, time=    466.008s
  Convergence achieved in 495 iterations
  Time spent in 495 iterations = 576.45703125 seconds
Comput_results . . .
Monostatic angle = 133.0 for incidence of 135
Backscatter RCS = -32.4620714732097 dB

Monostatic angle = 134.0 for incidence of 135
Backscatter RCS = -33.4548022989131 dB

Monostatic angle = 135.0 for incidence of 135
Backscatter RCS = -34.2064161100281 dB

Monostatic angle = 136.0 for incidence of 135
Backscatter RCS = -34.6451300478842 dB

Monostatic angle = 137.0 for incidence of 135
Backscatter RCS = -34.7619963563024 dB

Writing to viz...
   90.0000        140.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00789, time=    117.445s
  iter=  200, tol=  .00774, time=    233.586s
  iter=  300, tol=  .00356, time=    349.750s
  iter=  400, tol=  .00166, time=    465.906s
  Convergence achieved in 441 iterations
  Time spent in 441 iterations = 513.60546875 seconds
Comput_results . . .
Monostatic angle = 138.0 for incidence of 140
Backscatter RCS = -34.1474216447271 dB

Monostatic angle = 139.0 for incidence of 140
Backscatter RCS = -33.8695460162678 dB

Monostatic angle = 140.0 for incidence of 140
Backscatter RCS = -33.4315509761637 dB

Monostatic angle = 141.0 for incidence of 140
Backscatter RCS = -32.9283349091067 dB

Monostatic angle = 142.0 for incidence of 140
Backscatter RCS = -32.4218673610532 dB

Writing to viz...
   90.0000        145.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00593, time=    117.434s
  iter=  200, tol=  .00669, time=    233.594s
  iter=  300, tol=  .00193, time=    349.723s
  iter=  400, tol=  .00585, time=    465.879s
  Convergence achieved in 466 iterations
  Time spent in 466 iterations = 542.66015625 seconds
Comput_results . . .
Monostatic angle = 143.0 for incidence of 145
Backscatter RCS = -31.9434605415341 dB

Monostatic angle = 144.0 for incidence of 145
Backscatter RCS = -31.2597477014036 dB

Monostatic angle = 145.0 for incidence of 145
Backscatter RCS = -30.6794048703821 dB

Monostatic angle = 146.0 for incidence of 145
Backscatter RCS = -30.189855775616 dB

Monostatic angle = 147.0 for incidence of 145
Backscatter RCS = -29.779219257855 dB

Writing to viz...
   90.0000        150.0000           .0000
Gen_vector_soln . . .
```

```
Solver . . .
  iter=  100, tol=  .00151, time=    117.453s
  iter=  200, tol=  .00586, time=    233.602s
  iter=  300, tol=  .00509, time=    349.750s
  iter=  400, tol=  .00267, time=    466.207s
  Convergence achieved in 466 iterations
  Time spent in 466 iterations = 542.9765625 seconds
Comput_results . . .
Monostatic angle = 148.0 for incidence of 150
Backscatter RCS = -29.5880845590561 dB

Monostatic angle = 149.0 for incidence of 150
Backscatter RCS = -29.2127883503327 dB

Monostatic angle = 150.0 for incidence of 150
Backscatter RCS = -28.9001877578175 dB

Monostatic angle = 151.0 for incidence of 150
Backscatter RCS = -28.6413955553149 dB

Monostatic angle = 152.0 for incidence of 150
Backscatter RCS = -28.4290551053828 dB

Writing to viz...
   90.0000        155.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .01281, time=    116.152s
  iter=  200, tol=  .00793, time=    232.305s
  iter=  300, tol=  .00139, time=    348.441s
  iter=  400, tol=  .00381, time=    465.484s
  Convergence achieved in 460 iterations
  Time spent in 460 iterations = 535.28515625 seconds
Comput_results . . .
Monostatic angle = 153.0 for incidence of 155
Backscatter RCS = -27.8762419415829 dB

Monostatic angle = 154.0 for incidence of 155
Backscatter RCS = -27.6893530347835 dB

Monostatic angle = 155.0 for incidence of 155
Backscatter RCS = -27.5375843129348 dB

Monostatic angle = 156.0 for incidence of 155
Backscatter RCS = -27.4163692704904 dB

Monostatic angle = 157.0 for incidence of 155
Backscatter RCS = -27.3218073347269 dB

Writing to viz...
   90.0000        160.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .01536, time=    117.453s
  iter=  200, tol=  .00639, time=    233.605s
  iter=  300, tol=  .00310, time=    349.785s
  iter=  400, tol=  .00694, time=    466.527s
  Convergence achieved in 452 iterations
  Time spent in 452 iterations = 527.04296875 seconds
Comput_results . . .
Monostatic angle = 158.0 for incidence of 160
Backscatter RCS = -26.8655367461478 dB

Monostatic angle = 159.0 for incidence of 160
Backscatter RCS = -26.7782931991125 dB

Monostatic angle = 160.0 for incidence of 160
Backscatter RCS = -26.7118752757025 dB

Monostatic angle = 161.0 for incidence of 160
Backscatter RCS = -26.6635163304913 dB

Monostatic angle = 162.0 for incidence of 160
Backscatter RCS = -26.630820808826 dB

Writing to viz...
   90.0000        165.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00775, time=    116.215s
  iter=  200, tol=  .00669, time=    232.406s
  iter=  300, tol=  .00158, time=    348.660s
  iter=  400, tol=  .00448, time=    464.816s
  iter=  500, tol=  .00678, time=    580.949s
  Convergence achieved in 594 iterations
  Time spent in 594 iterations = 690.2109375 seconds
Comput_results . . .
Monostatic angle = 163.0 for incidence of 165
Backscatter RCS = -27.298737521097 dB
```

```
Monostatic angle = 164.0 for incidence of 165
Backscatter RCS = -27.2296717034791 dB

Monostatic angle = 165.0 for incidence of 165
Backscatter RCS = -27.1752435995706 dB

Monostatic angle = 166.0 for incidence of 165
Backscatter RCS = -27.1338085303912 dB

Monostatic angle = 167.0 for incidence of 165
Backscatter RCS = -27.1040196414777 dB

Writing to viz...
   90.0000        170.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00641, time=    125.441s
  iter=  200, tol=  .01327, time=    243.137s
  iter=  300, tol=  .00248, time=    368.316s
  iter=  400, tol=  .00154, time=    484.199s
  iter=  500, tol=  .00113, time=    611.688s
  iter=  600, tol=  .00367, time=    728.902s
  Convergence achieved in 611 iterations
  Time spent in 611 iterations = 741.765625 seconds
Comput_results . . .
Monostatic angle = 168.0 for incidence of 170
Backscatter RCS = -27.1145040593331 dB

Monostatic angle = 169.0 for incidence of 170
Backscatter RCS = -27.0584179425535 dB

Monostatic angle = 170.0 for incidence of 170
Backscatter RCS = -27.0148056214501 dB

Monostatic angle = 171.0 for incidence of 170
Backscatter RCS = -26.9826442039977 dB

Monostatic angle = 172.0 for incidence of 170
Backscatter RCS = -26.961156481101 dB

Writing to viz...
   90.0000        175.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00652, time=    126.375s
  iter=  200, tol=  .00415, time=    245.223s
  iter=  300, tol=  .00485, time=    361.148s
  iter=  400, tol=  .00136, time=    476.984s
  Convergence achieved in 442 iterations
  Time spent in 442 iterations = 525.7734375 seconds
Comput_results . . .
Monostatic angle = 173.0 for incidence of 175
Backscatter RCS = -26.4582510454739 dB

Monostatic angle = 174.0 for incidence of 175
Backscatter RCS = -26.4631873220129 dB

Monostatic angle = 175.0 for incidence of 175
Backscatter RCS = -26.469989166888 dB

Monostatic angle = 176.0 for incidence of 175
Backscatter RCS = -26.4779974462472 dB

Monostatic angle = 177.0 for incidence of 175
Backscatter RCS = -26.4867787691806 dB

Writing to viz...
   90.0000        180.0000           .0000
Gen_vector_soln . . .
Solver . . .
  iter=  100, tol=  .00731, time=    115.875s
  iter=  200, tol=  .00332, time=    231.777s
  iter=  300, tol=  .00279, time=    347.625s
  iter=  400, tol=  .00145, time=    463.762s
  Convergence achieved in 456 iterations
  Time spent in 456 iterations = 528.7734375 seconds
Comput_results . . .
Monostatic angle = 178.0 for incidence of 180
Backscatter RCS = -26.4233306415167 dB

Monostatic angle = 179.0 for incidence of 180
Backscatter RCS = -26.4191865002094 dB

Monostatic angle = 180.0 for incidence of 180
Backscatter RCS = -26.4172031721716 dB

Writing to viz...
Total computational time = 19281.87890625 seconds

Output files --
```

```
   Table of RCS data:          tab.mon.t90.0
   Total RCS vs. sweep angle: rcs.mon.t90.0

 for a fixed angle the = 90 with alpha = 0.

Done.
```

End of Solver Transcript.

Appendix D

FEMATS Solver Manual

User's and Test Case Manual for FEMATS

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D.1 Introduction

The FEM-ATS program incorporates first order edge-based finite elements and vector absorbing boundary conditions into the scattered field formulation for computation of the scattering from three-dimensional geometries. The code has been validated extensively for a large class of geometries containing inhomogeneities and satisfying transition conditions (see [1] for formulation). The FEMATS code has been optimized to run on the Cray Y-MP and parallelized to run on the Kendall Square Research (KSR) architecture and the Intel iPSC/860.

D.2 Data Generation

The computation of scattering from a specific geometry with FEMATS is a multi-stage process, as is shown in Figure 1. Once the geometric parameters of the target are known, a solid model is con-

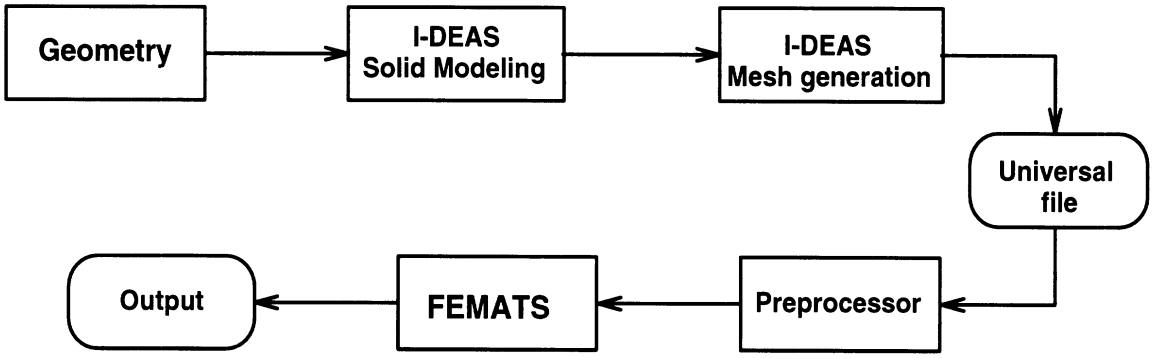


Figure D.1: Stages involved in scattering computation from arbitrary 3D geometries

structed in the Solid Modeling family of SDRC I-DEAS, a commercial CAD/CAE/CAM software package. The solid model is then exported to the Finite Element Modeling and Analysis family of I-DEAS, and the nodes and elements necessary for the scattering analysis are generated. This data is written to a output file, called a Universal file, and operated on by several preprocessors, generating the necessary input files for FEMATS.

The process of object modeling and mesh generation is an art, *not* a science. Hence, it cannot be taught, or demonstrated—it must be learned through experience. Hence, this manual is not by any means an I-DEAS FE mesh generation manual. In fact, it assumes (and requires) a working knowledge of, and familiarity with, the I-DEAS Solid Modeling and Finite Element Analysis families of tasks.

D.2.1 Solid Modeling

Once the geometry of the target is specified, it is constructed using the I-DEAS Solid Modeling Family of tasks. There is a tendency to downplay the importance of the solid model, and treat it only as a stepping stone towards a final product. However, the solid model is the framework for the finite element mesh, and as such, has a direct bearing on the quality of the mesh. Because of this, it is wise to keep the mesh generation problem as simple as possible. This helps to ensure a better mesh, and a more accurate answer.

In general, the object or body being meshed will contain various planes of symmetry. It is nearly always advisable to take advantage of whatever symmetry is available, as doing so will greatly reduce the amount of time necessary to generate the mesh. In fact, the geometry may require such

subdivision to make meshing possible. For more details about the creation of the solid model for FEMATS, please see the I-DEAS Solid Modeling User's Guide.

Note: When creating the Solid Model, FEMATS requires the dimensions to be in wavelengths.

D.2.2 Mesh Generation

I-DEAS generates the finite element mesh by creating mesh areas on surfaces, and then combining these mesh areas into mesh volumes ($2\frac{1}{2}$-D mesh generation). Each mesh volume is then filled with the chosen element type. When the solid model is imported into the Finite Element Modeling and Analysis Family of I-DEAS, these mesh areas and mesh volumes are automatically created. Generally, however, I-DEAS does not choose the correct element order (linear vs. parabolic), and the mesh volumes must be modified to reflect the correct element order. Even if the guidelines mentioned in Section D.2.1 are followed, the mesh areas that are auto-created by I-DEAS can become quite complex. It is then prudent to break the mesh volume into smaller, more manageable mesh volumes. For more details on mesh creation, please see the I-DEAS Finite Element Modeling User's Guide.

D.2.3 Modifying material property labels

After all the mesh volumes have been created , the material property labels of each need to be modified according to the type of material each mesh volume contains. The elements in the volume between the target and the outer boundary usually have a material property label of 1. If the target contains a dielectric-filled volume, the material property labels of the elements in that volume should be 2—actually any integer greater than 1. In this way, the code can accommodate up to 9 different material fillings. If the geometry requires more than 9 different materials, the dimensions of the vectors ϵ and μ should be modified (wherever they appear) to reflect the necessary number of materials.

Please see Appendix D.A for more details.

D.2.4 Type of meshing

The global element length also needs to be specified (usually .075–.085 units); finer meshing can be done in regions with rapidly changing fields or large curvatures by specifying the local element length or curvature-based size parameters. The geometry is then *free*-meshed using the I-DEAS Mesh Creation Task. It is essential to use *free* meshing and not *mapped* meshing, since the latter maps the mesh volume into a rectangular box and back, thus distorting the elements. No such distortion occurs in space when an electromagnetic wave travels through it; a *mapped* mesh, therefore, alters the physics of the problem and leads to inaccuracies in the final result.

Please see Appendix D.A for more details.

D.2.5 Grouping nodes

The finite element method essentially solves a boundary value problem; thus, it is crucial to identify surfaces or surface edges on which the boundary conditions are imposed. In the current version of FEMATS, this is carried out by grouping the nodes which lie on the surfaces where the boundary conditions are imposed. If the surface nodes coincide with a perfect electric conductor, the group is labeled C, if the nodes lie on a resistive sheet, the group is labeled R, and so on. Detailed information about node grouping is given in Appendix D.A.

Care must be taken when grouping surfaces that intersect, since edges connecting two such nodes may not lie on the surface at all. For example, suppose three surfaces intersect at the corner of a cube. If the nodes on each of these surfaces are not grouped separately, the processing program will

generate 'surface' edges which actually do not lie on the surface. Another anomaly may arise when the surfaces are separated by a single element. This is due to the fact that the processing program considers an edge to lie on the surface if two nodes in the group connect to form an edge. As a rule of thumb, it is best to group each surface separately. They may be grouped together only when the user is certain that spurious surface edges will not be created by the processing program.

Please see Appendix D.A for more details.

D.2.6 Universal file

The mesh information obtained from I-DEAS is then written to an ASCII file called the Universal file. The Universal file has a specific format for identifying the nodes, elements and groups which can be obtained from the I-DEAS User's guide.

It should be noted that only the FE entities and Groups need to be included into the Universal file. Also, while this discussion has dealt primarily with I-DEAS, any mesh generator that writes a Universal file will work just fine...

D.3 Preprocessing

The necessary preprocessing is performed by a number of smaller programs that operate on the Universal file generated by I-DEAS. Because FEMATS is designed to be run on a supercomputer, and I-DEAS and the preprocessors are generally run on a workstation of some sort, some of the preprocessing is performed on the workstation, and some of it on the supercomputer. In both cases, a script runs the necessary preprocessors, and presents the user with the necessary FEMATS input data files. (Note that while FEMATS has been designed to run on a supercomputer, it can peacefully co-exist with the preprocessors, etc. on the workstation. However, if FEMATS is to be run on the workstation, certain variable types must be changed to reflect the decreased precision inherent to most workstations.) To run the script that runs the preprocessors, type

```
femats.preproc file.unv
```

where `file.unv` is the name of the universal file containing the mesh information. This script extracts the necessary information from each preprocessor, and terminates with instructions informing the user of which files need to be transferred to the supercomputer for further preprocessing.

After the appropriate files have been transferred to the supercomputer, a script is also run there to finish the preprocessing. To run this script, type

```
femats.{arch} file
```

where {arch} is the architecture (either `ksr`, `cray`, or `paragon`), and `file` is the name of the original universal file, *without* the ending (`.unv`). This script will present the user with the necessary input files for FEMATS, along with a list of numbers required for input by FEMATS. Note that the above example is for the KSR.

Note: For efficiency, the dimensioning of the arrays in the preprocessors may be changed to reflect the size of the problem. On the UNIX workstation, the relevant dimension statements are contained in the file

```
(path)/femats/src/preproc/parmvl
```

For the re-dimensioning to take effect, recompile the preprocessors by typing `make all` in the `(path)/femats/src/preproc` directory. Similarly, on the supercomputer, the relevant dimension statements are in the file

```
(path)/femats/src/{arch}/fem_data.h
```

For these changes to take effect, recompile the preprocessor and FEMATS by typing `make all` in the `(path)/femats/src/{arch}` directory.

D.4 Running FEMATS

D.4.1 KSR-specific runtime information

Before executing FEMATS, the user must inform the operating system of the required number of processors. To do this, type

```
allocate_cells -A ##
```

where `##` is the requested number of cells. This command starts a new shell, and gives that shell control of `##` cells. Because of this, it is important to exit the shell when FEMATS finishes, so that others may use the processor cells.

After the new shell is running, the user must let the operating system know how many total threads it may run on the allocated cells by typing

```
setenv PL_NUM_THREADS ##
```

where `##` is the same as in the previous command. FEMATS may now be run safely.

To execute FEMATS, type

```
femats
```

at the shell prompt. FEMATS will then prompt the user for the necessary input (see following documentation).

FEMATS will also accept commands from standard input. This is necessary for use in batch mode. The commands from above are inserted into a shell script, along with the following statement:

```
femats < input.dat
```

where `input.dat` is a text file containing the input, just as it would be entered at the keyboard when running FEMATS interactively. The example in Section D.C shows this format.

If any problems arise, consult the KSR manuals, and the system administrator. The above steps assume that everything works the way it is supposed to.

D.4.2 Intel iPSC/860 -specific runtime information

As with the KSR, the desired number of processors need to be specified. The minimum memory requirement for each processor should also be known. This is done using the *getcube* command:

```
getcube -t x m y
```

where x is the number of processors and must be equal to an integer power of 2 and y is the memory required in megabytes per processor.

To execute FEMATS, type

```
load femats; waitcube
Interactive input
killcube
relcube
```

when running interactively or

```
load femats; waitcube < input.dat
killcube
relcube
```

when reading in data from an input file. These additional commands are necessitated by the fact that the cube is really just an attached set of processors to the System Resource Manager (SRM). Thus loading a job to the cube with just the *load* command is similar to putting the job in background (at least as far as standard I/O is concerned). To remedy this situation, the user must tell the SRM to wait for the cube - hence the *waitcube* command.

All modules - linear solver, matrix generation/assembly, excitation vector generation - of the FEMATS code was parallelized on the KSR. However, only the linear solver module was parallelized on the Intel iPSC/860 for benchmarking with other parallel architectures. As a result, the matrix generation and assembly on the iPSC/860 is still serial and a copy of the entire matrix needs to be stored on each processor. Thus the code is at present limited to small problems on the iPSC/860 as the individual nodes do not have enough memory to store the entire coefficient matrix. A way of getting past this problem is to generate and assemble the matrix on a workstation and read in the matrix elements from a file for solving the final system.

D.4.3 Cray-specific runtime information

The code was only vectorized on the Cray series of machines. Thus it always runs on a single processor with enhanced vectorization. To execute FEMATS, type

```
./femats < input.dat
```

where `input.dat` is a text file containing the input, just as it would be entered at the keyboard when running FEMATS interactively. The example in Appendix D.C shows this format.

D.4.4 Intel Paragon -specific runtime information

To execute FEMATS on the Paragon, type

```
femats < input.dat -sz ##
```

where `input.dat` is a text file containing the input and `##` is the number of processors to be used. As in the other cases, the format of the input file remains the same. The example in Section D.C shows the format.

D.4.5 FEMATS input documentation

It is faster to read the input data from a file; however, for the first-time user, interactive input provides more insight (see Section D.C).

```
Number of edges
```

Input the no. of edges obtained from **proc**.

```
No. of elements with surface edges on 1) pec 2) r-card 3) ibc
4) dielectric 5) outer boundary 6) outer surface of scatterer
```

Enter the no. of elements with surface edges on the various materials as obtained from **proc.f**. In the above statement, *pec* denotes a perfect electric conductor, *r-card* refers to a resistive card and *ibc* represents an impedance sheet.

```
If inhomogeneous, enter 0
```

Enter 0 as long as there are two or more material property labels (see Appendix D.C) present in the geometry. This holds for r-cards as well, since the top and bottom elements on a r-card have different material property labels.

```
Number of distinct dielectric materials
```

Enter the no. of distinct material property labels. Note that material property label 1 is free-space by default. If the mesh designates material property label 1 to anything other than free-space, the program won't run.

```
constitutive relative parameters for region ,i
```

Input the epsilon and mu of the dielectric in that order. For a r-card whose top and bottom surface is free-space, enter ϵ_r and μ_r of free space, i.e., unity.

```
If resistive card inside geometry enter 1
```

```
Number of different r-cards
```

Input the no.of r-cards having different resistivity values for the geometry.

```
Input: a) Material property label on top of card
       b) Material property label on bottom of card
       c) Normalized resistivity
```

The mesh must be constructed in such a way that the material property labels on the top and bottom surfaces of the R-card are different.

```
If impedance sheet inside geometry enter 1
```

```
Input: a) Material property label on top of impedance sheet
       b) Normalized impedance
```

```
Filename containing no. of nodes and elements
```

The number of nodes and elements in the finite element mesh need to be saved in a file.
Most of the data entered until now has been related to the geometry. The data entered from this point will be related to the iteration count, number of look angles, etc.

```
Tolerance, maximum iterations
```

The tolerance of the residual is usually kept between 0.001 and 0.0005. This is 0.1%–0.05% of the solution norm. Max. no. of iterations is determined by trial and error. A typical value for PEC targets is $N/100$ for $N > 25000$ and $N/120$ for $N > 75000$. The largest problem run to date contained 93000 unknowns and converged, on the average, in 800 iterations. The code uses a diagonally preconditioned biconjugate gradient method to solve the system, so the residual error will jump to abnormal values quite frequently.

```
1) Bistatic  2) Backscatter
```

Enter 1 for bistatic pattern, 2 for backscatter

```
All angle values should be integers
```

```
Bistatic
--------
Angle of incidence: theta,phi
Fix 1) phi 2) theta to specified angle
Angle of observation: start,end,increment
Polarisation angle: alpha=0(H_z=0); alpha=90(E_z=0)
```

In order to fix ϕ to 90° (say), the input should look like
1 90
To fix θ to 90° (say), the input should be
2 90

```
Backscatter
-----------
Fix 1)phi 2)theta to specified angle
Angle of incidence: start,end,increment
Polarisation angle: alpha=0(H_z=0); alpha=90(E_z=0)
```

```
Enter 1 for spherical outer boundary; 2 for mixed termination
```

The code works for spherical, flat or cylindrical mesh termination boundaries or any combination of these. The user should enter 1 at this juncture only if the mesh termination boundary is a sphere. For an outer boundary having any other shape (e.g., flat planes or cylinders or spherical sections), the user should enter 2.

```
No. of separate surfaces in outer boundary
```

The total number of distinct surfaces in the outer boundary must be entered. For example, a cylindrical boundary has three separate surfaces - the curved surface and the two flat surfaces at the top and at the bottom.

```
For a SPHERICAL section, enter center coordinates and radius
For a CYLINDRICAL section:
X-directed axis - 200000. yc      zc      radius
Y-directed axis - xc      200000. zc      radius
Z-directed axis - xc      yc      200000. radius
For a PLANAR section:
Parallel to YZ plane - xc      200000. 20000. 0.
Parallel to ZX plane - 200000. yc      20000. 0.
Parallel to XY plane - 200000. 20000.  zc     0.
```

The program needs the center coordinates and the radius of each distinct surface on the mesh termination boundary. For a spherical surface, this poses no problem. In order to have complete information about a cylindrical surface, we require its axis direction as well as the center coordinates and the corresponding radius of the curved surface. For example, a cylinder whose axis is oriented along the X-axis, and is centered along (x,1,-1) with a radius of 2 is described by the following input line:

```
200000. 1. -1. 2.
```

Similarly, a planar surface parallel to one of the principal planes is determined uniquely by specifying the magnitude of the constant coordinate. For example, the Z=2 plane is described by the following input line:

```
200000. 200000. 2. 0.
```

In this way, a combination of simple surfaces making up the outer termination boundary can be input to the program. The program handles only these three surfaces at present since these lead to symmetric systems of equations when incorporated into the finite element matrix. The theory can handle any doubly curved surface ; they would, however, lead to an unsymmetric system of linear equations.

Appendix D.A

Stipulations for Mesh Generation

- the region surrounding the scatterer should have a material property number label of 1, i.e., the least possible value.
- for a surface draped by a resistive card, it is essential to differentiate the top surface from the bottom surface. The only way the program can discern this from the available data is by checking the material property number labels of the elements on the top and bottom surfaces. The material property number label of the top surface must be different from that of the bottom surface.
- when meshing a mesh-volume filled with a dielectric having a certain permeability and permittivity, the material property label number should be different from that of surrounding space.
- when grouping surface nodes, the group labels should start with a
  - **C** if the nodes lie on a perfect electrical conductor
  - **R** if the nodes lie on a resistive card
  - **D** if the nodes lie on a dielectric
  - **A** if the nodes lie in free space (i.e. on the mesh termination boundary)
  - **O** if the nodes lie on the outer surface of the scatterer

  The above order (C, R, D, A, O) *must* be maintained when grouping nodes.
- Nodes on the interfaces of materials having different constitutive parameters must be grouped.

Appendix D.B

Code Theory of Operation

proc.f

proc.f converts the mesh information stored in the Universal file into a more usable form for analysis by FEMATS. It first reads in the nodal co-ordinates, nodal connectivity and the grouped nodes from the Universal file. Since FEMATS uses edge-based shape functions, the edges and the nodes connecting them need to be identified. Because each edge is shared by more than one element, care must be taken so that the same edge is not counted more than once. A comparison of the connecting nodes must therefore be made to identify the old edges, and create the new ones. This can be a computationally intensive task if a brute force approach is taken, especially if the problem size is very large. It is necessary to use an algorithm that would scale at most linearly with the number of nodes or edges, i.e. the number of comparisons required for identifying old or new edges should be an $O(N)$ process.

In order to realize this requirement, the ITPACK scheme [2] is utilized to store the node connectivity information. The ITPACK scheme is attractive because the number of comparisons required while augmenting the connectivity matrix depends only on the locality of the corresponding node and not on the total number of nodes or edges. In the ITPACK storage scheme, the number of rows of the connectivity matrix is equal to the number of nodes and the number of columns equals the maximum number of nodes connected to a particular node. However, this approach wastes space when the number of connecting nodes varies widely, so a modified ITPACK format is used—the number of columns in the connectivity matrix now equals the average number of nodes connected to a particular node, and the number of rows is slightly more than the total number of nodes. The storage requirement for such a matrix is usually $1.1N_n \times 16$ integers, where N_n equals the number of nodes.

After generating the edges, FEMATS uses the same storage scheme for finding the surface edges and elements from the grouped nodes. These surface edges are then sorted in ascending order by element number for the various materials and boundaries on which they lie. All components of the code are extremely fast, with the slowest being the sorting routine.

The output files from **proc.f** are

- **enode**
  contains co-ordinates of all the nodes in the geometry.
- **eglob**
  contains the edges making up each element.
- **edge**
  contains the nodes making up each edge.
- **esurfed**
  contains the element numbers, node numbers and corresponding edge numbers of the on-surface edges.
- **otpt**
  contains the number of edges in the geometry and the number of elements with surface edges on the PEC, R-card, dielectric, outer boundary and outer surface of scatterer.

Required storage is about $18N$ real Words, where N is the number of unknowns and is equal to the number of edges making up the mesh.

count.f

count.f asks for the number of edges in the geometry and generates **cntr** as the output. **cntr** contains the number of non-zero entries per row for the finite element system. The number usually varies from 9 to 31 for a typical system. Required storage is about $13N$ real Words, where N again denotes the number of unknowns.

fem.f

This is the main program (FEMATS) which computes backscatter or bistatic patterns after reading in the mesh files created by **proc.f** and **count.f**. Parameters like the number of edges, number of surface elements, type of pattern, etc. can be read in interactively or from a file. The backscatter or bistatic pattern is returned in a separate file. If the code fails to run for some reason, a list of errors is returned in the error file. The flow of control of FEMATS is given in Figure 2. The formulation for the methodology is given in [2].

Input files: The input files containing the mesh information and parameters for running the probelm are read in, usually in binary format. The ASCII format is quite slow for most machines and prohibitively slow on the KSR1. A small program usually converts the mesh files from ASCII to binary.

Processing data: Some preliminary processing is done to find the radius of the outer boundary if a spherical mesh termination scheme is used.

FE matrix generation/assembly: The finite element matrix generation is done on an element-by-element basis. The elemental matrix is first computed, and then assembled into the global sparse matrix. The assembly is simplified since the number of non-zero entries per row of the matrix is known $apriori$ and the order of the entries is not important. The non-zero entries of the final sparse matrix are stored in a long complex vector, the corresponding column numbers are stored in an integer vector, and the location of the first non-zero entry for each row is stored in another integer vector. This is the well-known Compressed Sparse Row (CSR) format used in public domain software packages like SLAP and SPARSPAK. The coefficient matrix is not a function of the angle of incidence.

The code also uses a simple diagonal preconditioner for speeding up the iterative process. Other complicated preconditioning strategies are also available. However, except for the block ILU preconditioner, none of them compare favourably with the point diagonal preconditioner in terms of solution time.

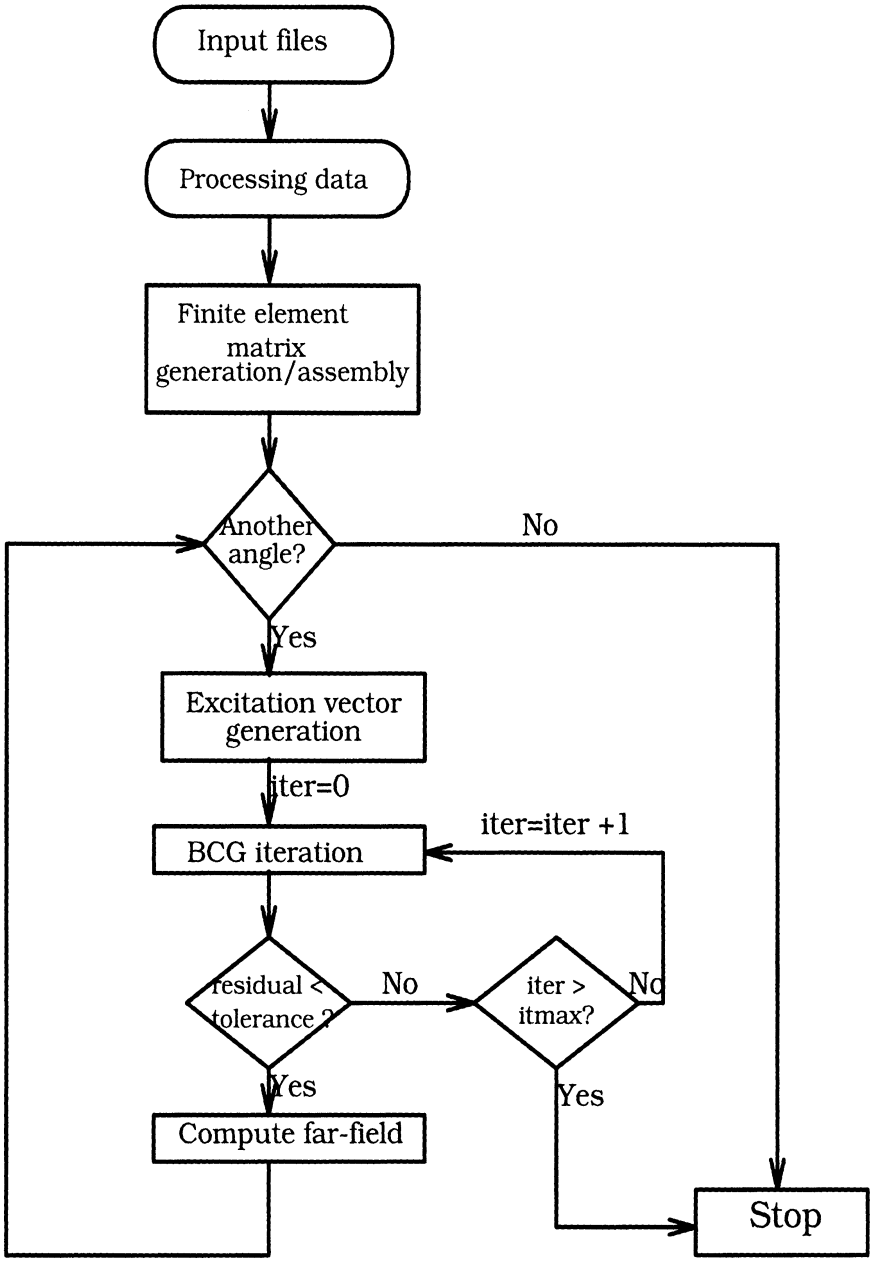
Excitation vector generation: The excitation vector generation is not very cpu-intensive, since the vectors are always quite sparse. It is a function of the angle of incidence.

BCG iteration: The biconjugate gradient (BCG) algorithm is used with preconditioning to solve the sparse, symmetric system of linear equations. Each iteration of the algorithm involves 1 sparse-matrix vector product, 3 vector updates and 3 inner products. The norm of the residual vector is computed after every iteration to check for convergence. Reliable results have been obtained by setting the convergence criterion to be

$$\|r^k\| < 0.001 * \|b\|$$

where r^k is the residual vector after the kth iteration and b is the excitation vector.

Far-field evaluation: The far-field is evaluated by integrating the near-zone fields over a closed surface using the Stratton-Chu integral equation. The surface is usually taken to be very close to or on the body itself to achieve maximum accuracy.



Flowchart of finite element code

Figure D.2: Flowchart for FEMATS

Storage required for the code is at present $36N$ complex Words, where N is the number of unknowns. The storage can be cut by 40% if only the symmetric upper triangular part of the object matrix is stored; the code, however, slows down significantly.

Subroutine functions in fem.f

basis.f
Calculates the two constant vectors of the bases for the finite element discretization as well as the element volume.

bicg.f
The diagonally preconditioned biconjugate gradient solver for symmetric, linear systems of equations.

bd1.f
Assigns each surface element on the mesh termination boundary its surface particulars.

calc.f
Computes the volume integral for the finite element discretization analytically.

comput.f
Calculates the basis functions at the mid-point of each edge.

crux.f
Computes the element matrix from the volume integral.

cruxd.f
Imposes the boundary condition for dielectric volumes and generates the corresponding excitation vector.

diag.f
Generates the diagonal preconditioner for solving the system of equations iteratively.

f1.f
Carries out the volume integration of $\mathbf{W}_i \cdot \mathbf{W}_j$ analytically.

bi2mono.f
Computes the far-field pattern for a particular angle of incidence. If a monostatic pattern is desired, then monostatic values are approximated for the computed angle of incidence as well as for the adjacent angles $\pm 5^o$.

finc.f
Computes the volume integral for a dielectric volume to be used in the excitation vector.

fcmb.f
Carries out the surface integration for the absorbing boundary condition employed on the mesh termination boundary.

hpsrt.f
A standard heapsort routine.

incc.f
Imposes the boundary condition for a perfect electric conductor. If *iter* is 0, the excitation vector is computed, otherwise changes are made to the element matrix.

incd.f
Imposes the boundary condition for a dielectric surface.

inci.f
Imposes the boundary condition for an impedance sheet.

incr.f
Imposes the boundary condition for a resistive card.

mat.f
Performs finite element matrix generation and assembly.

mult.f
Carries out the sparse matrix-vector multiplication for the iterative solver.

norm2d.f
Computes the element normal for a 2D geometry.

norma.f
Computes the element normal for a surface element.

ops.f
Performs elementary vector and matrix operations.

ord.f
Identifies the global nodes and edges in the local context.

sort.f
Sorts the edges in a element according to a specific numbering scheme.

surfint.f
Imposes the absorbing boundary condition on the mesh termination boundary.

value.f
Computes the far-field using the Stratton-Chu integral equation.

volume.f
Calculates the element volume.

xc.f
Generates the excitation vector for each angle of incidence.

Appendix D.C

Example FEMATS Run

A perfectly conducting cylindrical inlet was run on the KSR1 machine. The geometry was enclosed by a rectangular outer boundary and the backscatter pattern was sought for $\theta = 0°$–$90°$ *and* $\alpha = 90°$. *The problem had 213,832 unknowns and a diagonally preconditioned BCG solver was used.*

Input file:

```
213832
13656 0 0 0 10704 7704
0
2
(1.,0.) (1.,0.)
0
0
eg
.001 10000
2
1 90
0 90 5
90
2
6
200000. 200000. 1.35 0.
200000. 200000. -1.35 0.
1.4 200000. 200000. 0.
-1.4 200000. 200000. 0.
200000. 1.4 200000. 0.
200000. -1.4 200000. 0.
```

Output file:

```
 Number of threads =   56
 Backscatter pattern will be computed
 Polarisation angle=   90
 Incident angle from   0  to   90
 in steps of   5
 Sweep through theta ; phi=   90
 ***********************************************
                Problem size
 Number of nodes =   32453
 Number of elements =   176048
 Number of edges/unknowns =   213832
 ***********************************************
 Finished reading in data
 Outer boundary shape is
 Mixed
 For a SPHERICAL section, enter center coordinates and radius
 For a CYLINDRICAL section:
 X-directed axis - 200000. yc      zc      radius
 Y-directed axis - xc      200000. zc      radius
 Z-directed axis - xc      yc      200000. radius
 For a PLANAR section:
 Parallel to YZ plane - xc      200000. 20000. 0.
 Parallel to ZX plane - 200000. yc      20000. 0.
 Parallel to XY plane - 200000. 20000.  zc     0.
 Time spent for unformatted I/O =     1.0519631999999999  secs
 Time spent for I/O =     1.0754451999999999  seconds
 Generating finite element matrix
 Generated finite element matrix
 No.\ of non-zeros =   3414496
```

```
Average no.\ of non-zeros =   15
Total time spent=     25.834841199999996  secs
Time spent in loop=     24.807681599999999  secs
Generated diagonal preconditioner
Time for preconditioner =     1.1077387999999999  secs
************************************************
   90.000000000000000   0.    90.000000000000000
 (   23874.682292021858,  0.)
Time spent in gen. soln. vector =     19.514778000000000  secs
Convergence achieved in   4397  iterations
Time spent in   4397  iterations =     584.26175160000003  secs
Backscatter =     13.132205300654515

   90.000000000000000    5.0000000000000009    90.000000000000000
 (   23874.649727818964,  0.)
Time spent in gen. soln. vector =     20.677881599999978  secs
Convergence achieved in   1878  iterations
Time spent in   1878  iterations =     248.19567480000001  secs
Backscatter =     12.346785646714235

   90.000000000000000    10.000000000000002    90.000000000000000
 (   23874.552995090075,  0.)
Time spent in gen. soln. vector =     20.646470399999998  secs
Convergence achieved in   6561  iterations
Time spent in   6561  iterations =     866.82569879999994  secs
Backscatter =     10.984172458513957

   90.000000000000000    15.000000000000002    90.000000000000000
 (   23874.394947730074,  0.)
Time spent in gen. soln. vector =     20.678055200000017  secs
Convergence achieved in   6112  iterations
Time spent in   6112  iterations =     807.46988880000004  secs
Backscatter =     8.0404387189358921

   90.000000000000000    20.000000000000004    90.000000000000000
 (   23874.180257205706,  0.)
Time spent in gen. soln. vector =     20.636231199999656  secs
Convergence achieved in   6430  iterations
Time spent in   6430  iterations =     849.45422520000011  secs
Backscatter =     4.5520666697643231

   90.000000000000000    25.000000000000000    90.000000000000000
 (   23873.915286302414,  0.)
Time spent in gen. soln. vector =     20.640396400000100  secs
Convergence achieved in   6303  iterations
Time spent in   6303  iterations =     832.76715800000011  secs
Backscatter =     1.8286943794696267

   90.000000000000000    30.000000000000004    90.000000000000000
 (   23873.607915069253,  0.)
Time spent in gen. soln. vector =     20.624299199999768  secs
Convergence achieved in   4543  iterations
Time spent in   4543  iterations =     600.40641159999996  secs
Backscatter =     2.1870075445461543

   90.000000000000000    35.000000000000007    90.000000000000000
 (   23873.267321948337,  0.)
Time spent in gen. soln. vector =     20.654717999999775  secs
Convergence achieved in   6015  iterations
Time spent in   6015  iterations =     794.75217840000005  secs
Backscatter =     2.9538913638132449

   90.000000000000000    40.000000000000007    90.000000000000000
 (   23872.903724276915,  0.)
Time spent in gen. soln. vector =     20.636641200000668  secs
Convergence achieved in   6215  iterations
Time spent in   6215  iterations =     821.00750359999984  secs
Backscatter =     4.3094572190189613
```

```
   90.000000000000000    45.000000000000000    90.000000000000000
 (   23872.528083709803,  0.)
Time spent in gen. soln. vector =     20.691929999999957  secs
Convergence achieved in   3213  iterations
Time spent in   3213  iterations =     424.64956839999923  secs
Backscatter =     4.0201582083152863

   90.000000000000000    50.000000000000000    90.000000000000000
 (   23872.151783594894,  0.)
Time spent in gen. soln. vector =     20.679000399999495  secs
Convergence achieved in   3196  iterations
Time spent in   3196  iterations =     422.23548159999973  secs
Backscatter =     6.0710219487833603

   90.000000000000000    55.000000000000000    90.000000000000000
 (   23871.786286832561,  0.)
Time spent in gen. soln. vector =     20.649760399999650  secs
Convergence achieved in   5037  iterations
Time spent in   5037  iterations =     665.48518600000079  secs
Backscatter =     6.0386806852857617

   90.000000000000000    60.000000000000007    90.000000000000000
 (   23871.442784137245,  0.)
Time spent in gen. soln. vector =     20.630159599999388  secs
Convergence achieved in   5096  iterations
Time spent in   5096  iterations =     673.35249359999943  secs
Backscatter =     2.9883959797387871

   90.000000000000000    65.000000000000000    90.000000000000000
 (   23871.131843785708,  0.)
Time spent in gen. soln. vector =     20.649902799999836  secs
Convergence achieved in   5096  iterations
Time spent in   5096  iterations =     673.46241600000030  secs
Backscatter =     4.1405354898674034

   90.000000000000000    70.000000000000014    90.000000000000000
 (   23870.863074712492,  0.)
Time spent in gen. soln. vector =     20.627787199999148  secs
Convergence achieved in   4893  iterations
Time spent in   4893  iterations =     646.38884879999932  secs
Backscatter =     3.4527505854226375

   90.000000000000000    75.000000000000014    90.000000000000000
 (   23870.644815085496,  0.)
Time spent in gen. soln. vector =     20.643494799998734  secs
Convergence achieved in   3459  iterations
Time spent in   3459  iterations =     457.10817280000083  secs
Backscatter =    -0.42219432577245863

   90.000000000000000    80.000000000000014    90.000000000000000
 (   23870.483858181193,  0.)
Time spent in gen. soln. vector =     20.630811200000608  secs
Convergence achieved in   4885  iterations
Time spent in   4885  iterations =     645.37610479999967  secs
Backscatter =     4.9808095185448629

   90.000000000000000    85.000000000000000    90.000000000000000
 (   23870.385226404902,  0.)
Time spent in gen. soln. vector =     20.668981599999825  secs
Convergence achieved in   1924  iterations
Time spent in   1924  iterations =     254.26892960000077  secs
Backscatter =     8.0244739010739181

   90.000000000000000    90.000000000000000    90.000000000000000
 (   23870.352002710646,  0.)
Time spent in gen. soln. vector =     20.646247599999697  secs
Convergence achieved in   1747  iterations
```

```
Time spent in   1747  iterations =     231.11860320000051  secs
Backscatter =     8.7459369327904284

Total time =     11978.956639599999  seconds
```

Appendix D.D

I-DEAS Universal File Information

In order to facilitate development of data file translators for mesh generation packages other than I-DEAS, a brief (but hopefully complete) description of the universal file format, and the pertinent datasets, follows.

Each universal file is a sequentially-formatted text file with records a maximum of 80 characters long, and is divided into sections called datasets. Between datasets, the universal file may contain lines (for example, comments), which are not part of any dataset, and will be ignored.

Datasets

The first and last record of each dataset is marked by the dataset delimiter, which consists of a minus sign in column 5 and a numeric one in column 6. The remainder of the line is blank.

The second record in the dataset is the dataset type. This is an integer between 1 and 32767, right-justified in columns 1 through 6. The remainder of the line is blank.

The rest of the records in the dataset follow the format specified for that dataset in the I-DEAS manual. The pertinent ones for FEMATS are discussed below.

Universal File Processing

Processing of the universal file begins by searching for the first dataset delimiter. Next, the dataset type line is read to determine whether the program needs to process this dataset. If the dataset is to be processed, the program reads the data per the specifications for that dataset. Otherwise, the program skips to the next dataset delimiter, which marks the end of the dataset, and begins the search process for another dataset delimiter again. This cycle continues until the end of file condition is reached.

It should be noted that the end of file condition should only occur between datasets. An end of file occuring during dataset processing indicates an incomplete dataset. Finally, datasets may occur in any order in the universal file, but with the restriction that a dataset may reference data in other datasets only if the other dataset precedes it in the file.

FEMATS-Specific Datasets

As mentioned above, FEMATS only requires two sets of data—the FE Entities, and the Groups. This is equivalent to three datasets in the universal file—datasets 752, 780, and 781. These are, respectively, the Permanent Groups, the Elements, and the Double Precision Nodes datasets. A description of each follows, along with an example. The format description for each line is given in terms of the FORTRAN equivalent.

Dataset 752: Permanent Groups

Record 1:	FORMAT(6I10)	
	Field 1	- group number
	Field 2	- active constraint set no. for group
	Field 3	- active restraint set no. for group
	Field 4	- active load set no. for group
	Field 5	- active dof set no. for group
	Field 6	- number of entities in group
Record 2:	FORMAT(20A2)	
	Field 1	- group name
Record 3–N:	FORMAT(8I10)	
	Field 1	- entity type code
	Field 2	- entity tag
	Field 3	- entity type code
	Field 4	- entity tag
	Field 5	- entity type code
	Field 6	- entity tag
	Field 7	- entity type code
	Field 8	- entity tag

Repeat Record 3 for all entities as defined by Record 1, Field 6. Records 1 thru N are repeated for each group in the model.

The group number (Record 1, Field 1) is strictly a numeric counter, starting at one. In FEMATS, Fields 2–5 of Record 1 are not used, and should be set to zero. Record 1, Field 6 is self-explanatory.

Record 2, Field 1 is a 40 character name, describing the group. In I-DEAS this name may have any number of spaces, etc. However, FEMATS expects certain naming conventions. As mentioned in Appendix D.A, the group names must begin with a certain letter, and occur in a certain order, as follows: C, R, D, A, and O (for conductor, resistive card, dielectric, free space (air), and outer surface of the scatterer, respectively).

Records 3–N describe the entity type and identifying tag number. For FEMATS, the entity type code will always be 7—a finite element node. Type codes for other entities may be found in the I-DEAS Core Utilities manual.

Example:

```
  -1
   752
         1         0         0         0         0        14
C1
         7         1         7         2         7         3         7         4
         7         8         7         9         7        10         7        11
         7        12         7        13         7        14         7        15
         7        64         7        65
         2         0         0         0         0       146
A1
         7         5         7         6         7         7         7        27
         7        28         7        29         7        30         7        31
         7        32         7        33         7        34         7        35

etc....
```

```
        7       264         7       265         7       266         7       267
        7       268         7       269         7       270         7       271
        7       272         7       273
        3         0         0         0         0        14
O1
        7         1         7         2         7         3         7         4
        7         8         7         9         7        10         7        11
        7        12         7        13         7        14         7        15
        7        64         7        65
   -1
```

In this example, there are three groups, numbered 1 through 3, and named C1, A1, and O1, respectively. Groups C1 and O1 have 14 entities associated with them, while group A1 has 146 entities. All the entities in all the groups are entity type 7 - nodes.

Dataset 780: Elements

Record 1:	FORMAT(8I10)	
	Field 1	- element label
	Field 2	- fe descriptor id
	Field 3	- physical property table bin number
	Field 4	- physical property table number
	Field 5	- material property table bin number
	Field 6	- material property table number
	Field 7	- color
	Field 8	- number of nodes on element
Record 2:	FORMAT(8I10)	
	Fields 1–n	- node labels defining element

Records 1 and 2 are repeated for each element in the model.

The element label (Record 1, Field 1) is strictly a numeric counter, starting at one. Record 1, Field 2 defines the element type. Although many element types exist, FEMATS only uses one - a solid linear tetrahedron - element type 111. Record 1, Fields 3 and 4 are not used by FEMATS, and should be set to 1. The material properties (Record 1, Fields 5 and 6), however, are used by FEMATS to distiguish between the different materials in each mesh volume. Generally, Record 1, Field 5 is set to 1, and Record 1, Field 6 indicates the material property label discussed in Section D.2.3 of the FEMATS User's Manual. Record 1, Field 7 indicates the element color, and is not used in FEMATS. Record 1, Field 8 is self-explanatory.

Record 2 contains enough entries, and thus, enough lines, to list all the nodes on a particular element. For FEMATS, since only solid linear tetrahedra are used, there will only be 4 nodes, and thus only one line per element.

Example:

```
  -1
 780
        1       111         1         2         1         1         7         4
        9        22        11         2
        2       111         1         2         1         1         7         4
```

```
        22        293         92          9
         3        111          1          2          1          1          7          4
        22         11        293          9

etc....

     18222        111          1          2          1          2          7          4
      3294       3249       1363       3250
     18223        111          1          2          1          2          7          4
      3291       1341       3249       1340
     18224        111          1          2          1          2          7          4
      3291       3249       1341       3294
    -1
```

In this example, there are 18,224 elements, all solid linear tetrahedra. They all have the same material properties, and are thus all in the same medium. As would be expected, they all have 4 nodes, and their color is 7 (green).

Dataset 781: Nodes - Double Precision

Record 1:	FORMAT(4I10)	
	Field 1	- node label
	Field 2	- definition coordinate system number
	Field 3	- displacement coordinate system number
	Field 4	- color
Record 2:	FORMAT(1P3D25.16)	
	Fields 1–3	- 3-dimensional coordinates of node in the definition system

Records 1 and 2 are repeated for each node in the model.

The node label (Record 1, Field 1) is strictly a numeric counter, starting at one. Record 1, Field 2 indicates the coordinate system used to define the node locations. While the three standard coordinate systems are available - Cartesian, cylindrical, and spherical (numbers 0, 1, and 2, respectively), FEMATS only uses Cartesian. Hence, both Record 1, Field 2 and Record 1, Field 3 should be zero. Record 1, Field 4 indicates the node color, and is not used in FEMATS.

Fields 1–3 of Record 2 are the 3-dimensional coordinates of the node locations, in double precision format. In general, these three values are expressed in terms of the appropriate coordinate variables, i.e. for spherical coordinates, the coordinate variables are (r, θ, ϕ), while for cylindrical coordinates, the appropriate variables are (r, θ, z). Since FEMATS only uses the Cartesian system, the appropriate variables are (x, y, z).

Example:

```
 -1
781
       1         0         0        11
-1.1250000447034835E+00  0.0000000000000000E+00  1.4375000260770320E+00
       2         0         0        11
 0.0000000000000000E+00 -1.1250000447034835E+00  1.4375000260770320E+00
       3         0         0        11
 0.0000000000000000E+00  0.0000000000000000E+00  1.4375000260770320E+00
```

```
etc....

      3718         0         0        11
  -1.1962018850819641E-01  -7.3728312687791492E-02   9.1661646783763676E-02
      3719         0         0        11
  -5.5161825599575895E-02  -6.6190053659418503E-02   9.6638066869683866E-02
      3720         0         0        11
  -8.5961703548581673E-02  -1.1321300839107060E-01   5.2343589137973839E-02
    -1
```

In this example, there are 3720 nodes, all defined in the Cartesian coordinate system, and their color is 11 (red).

NOTE: Although these datasets have been presented in numerical order by number, it should be realized that dataset 781 (Nodes) must precede dataset 780 (Elements) in the universal file, as dataset 780 references information from dataset 781. Also, since the groups depend on both the nodes and elements, dataset 752 (Groups) should appear after both dataset 780 and 781.

Following is an example universal file generated in I-DEAS for use with FEMATS. Because I-DEAS requires other information in excess of that necessary for FEMATS, there are several datasets included in the following universal file which are not described above. As these datasets are not necessary for FEMATS, and are only necessary if the user is attempting to write a full conversion routine from some other mesh generation package to I-DEAS, or trying to import their mesh into I-DEAS, they will not be covered in this manual, and the user is referred to both the I-DEAS Core Utilities Manual and the I-DEAS PEARL Manual for more information.

Sample I-DEAS Universal File:

```
    -1
   151
temp1
temp1
SDRC  I-DEAS VI.i:  Monitor
04-AUG-93   10:55:54         6         0
04-AUG-93   14:00:32
SDRC  I-DEAS VI.i:  FE_Modeling_&_Analysis
04-AUG-93   14:01:59
    -1
    -1
   164
        5Modified SI (mm)             2
  1.0000000000000000E+03  1.0000000000000000E+03  1.0000000000000000E+00
  2.7314999999999960E+02
    -1
    -1
   800
        1
WORKING_SET1
    -1
    -1
   770
        1         0
MAIN
    -1
    -1
   771
        1         1         1
FE MODEL1
```

```
    -1
    -1
   781
         1         0         0        11
   1.5000000712461767E-01  -2.7105054312137611E-17   0.0000000000000000E+00
         2         0         0        11
   0.0000000000000000E+00   0.0000000000000000E+00   0.0000000000000000E+00
         3         0         0        11
   2.1175823681357506E-17   1.5000000712461767E-01   0.0000000000000000E+00

etc....

   3.7500877506659887E-01   1.4697603711765345E-01   8.7404428380300838E-02
       451         0         0        11
   3.7094838851549648E-01   6.9079955860908915E-02   8.3694518214300438E-02
       452         0         0        11
   3.9089404906600184E-01   9.8862596006164716E-02   4.3313292570483312E-02
    -1
    -1
   780
         1       111         1         2         1         1         7         4
         9        22        11         2
         2       111         1         2         1         1         7         4
        22       293        92         9
         3       111         1         2         1         1         7         4
        22        11       293         9

etc...

      1762       111         1         2         1         1         7         4
        65         8        15       296
      1763       111         1         2         1         1         7         4
        92         8        65       296
      1764       111         1         2         1         1         7         4
        91         8        92       296
    -1
    -1
   734
         1        17         1 1.000000E+00         0 1.000000E+00
         2 0.000000E+00 0.000000E+00
 0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00 1.000000E+00 0.000000E+00
 0.000000E+00 0.000000E+00 0.000000E+00-1.000000E+00-1.000000E+00 1.000000E+00
 1.000000E+00 0.000000E+00 0.000000E+00 1.000000E+00 1.000000E+00 0.000000E+00
 1.000000E+00 0.000000E+00 1.000000E+00 1.000000E+00 1.000000E+00 1.000000E+00
-1.000000E+00-1.000000E+00-1.000000E+00-1.000000E+00 1.250000E+00 1.250000E+00
 0.000000E+00 1.500000E+00
    -1
    -1
   752
         1         0         0         0         0        14
C1
         7         1         7         2         7         3         7         4
         7         8         7         9         7        10         7        11
         7        12         7        13         7        14         7        15
         7        64         7        65
         2         0         0         0         0       146
A1
         7         5         7         6         7         7         7        27
         7        28         7        29         7        30         7        31
         7        32         7        33         7        34         7        35

etc....

         7       264         7       265         7       266         7       267
         7       268         7       269         7       270         7       271
         7       272         7       273
         3         0         0         0         0        14
O1
```

```
     7         1         7         2         7         3         7         4
     7         8         7         9         7        10         7        11
     7        12         7        13         7        14         7        15
     7        64         7        65
-1
```

Appendix D.E

Benchmark Test Case Manual

Most of the benchmark geometries specified by the Electromagnetics Code Consortium (EMCC) have been run with FEMATS. These benchmark cases demonstrate the code's validity and allow the user to verify the correct operation of the code on his/her machine. The following testcases are included here.

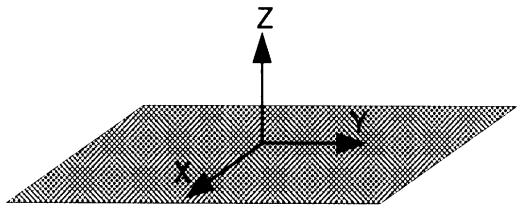
1. EMCC Target #4, Rectangular PEC Plate; $\phi = 0°$, vv-pol
2. EMCC Target #4, Rectangular PEC Plate; $\phi = 90°$, vv-pol
3. EMCC Target #4, Rectangular PEC Plate; $\phi = 90°$, hh-pol
4. EMCC Target #6, Foam Cylinder, Co-Linear Wires
5. EMCC Target #6, Foam Cylinder, Wires in Echelon
6. EMCC Target #8, Glass Plate
7. $1.0\lambda \times 1.0\lambda \times 1.5\lambda$ Rectangular Inlet, Rectangular Mesh Termination, vv-pol
8. $1.0\lambda \times 1.0\lambda \times 1.5\lambda$ Rectangular Inlet, Rectangular Mesh Termination, hh-pol
9. $1.0\lambda \times 1.0\lambda \times 1.5\lambda$ Spherical Inlet, Rectangular Mesh Termination, vv-pol
10. $1.0\lambda \times 1.0\lambda \times 1.5\lambda$ Spherical Inlet, Rectangular Mesh Termination, hh-pol
11. 1.875λ height $\times 1.25\lambda$ dia Circular Inlet, Cylindrical Mesh Termination, vv-pol
12. 1.875λ height $\times 1.25\lambda$ dia Circular Inlet, Cylindrical Mesh Termination, hh-pol

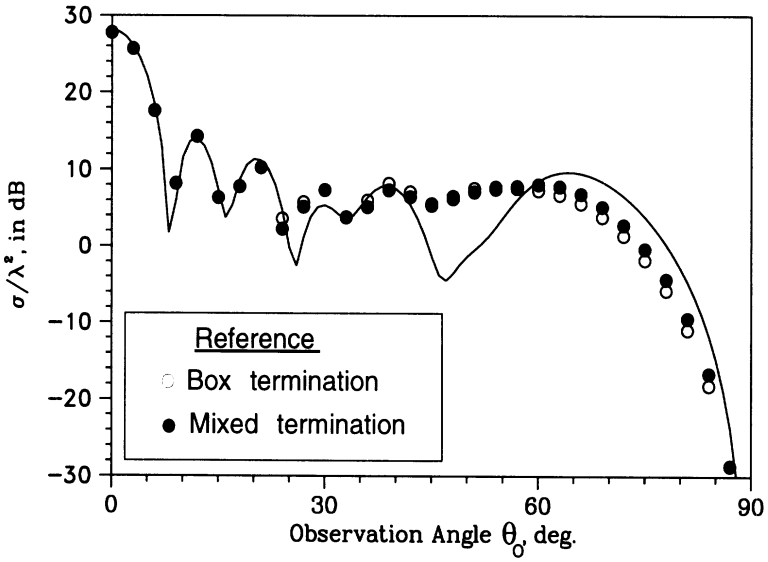
Plots of each case are included in order following this introduction.

The original universal file, the pre-processor input files, the pre-processor output files, and the FEMATS input files, along with the file containing the plot data, are included in the appropriate subdirectory in the benchmark subdirectory (~femats/bench) of the FEMATS installation tree, given at the bottom of each plot.

Rectangular PEC Plate Benchmark Target

3.5 λ x 2.0 λ Plate, ϕ = 0°
VV-Polarization



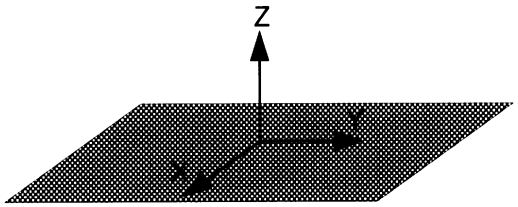


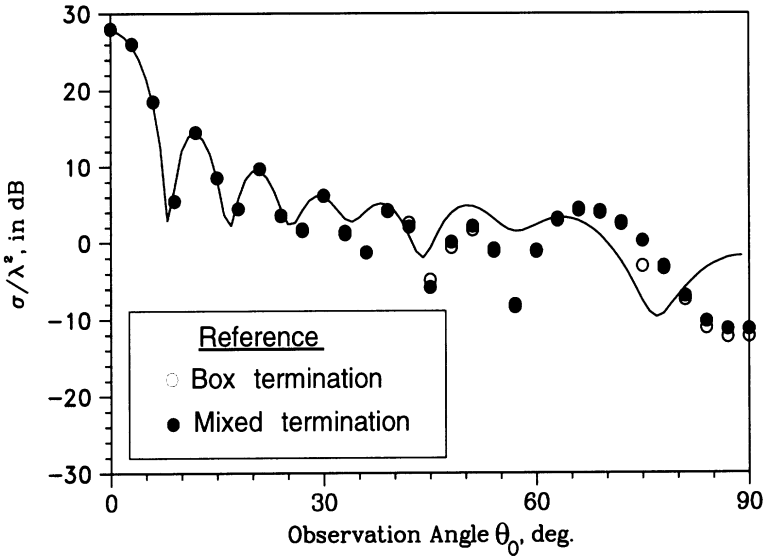
Backscatter Pattern of Metal Plate

This file (rect_plate_p0_vv.ps) and its associated input, output, and runtime data in ~femats/bench/rect_plate.

Rectangular PEC Plate Benchmark Target

3.5 λ x 2.0 λ Plate, ϕ = 0°
HH-Polarization



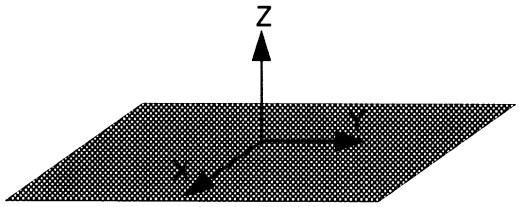


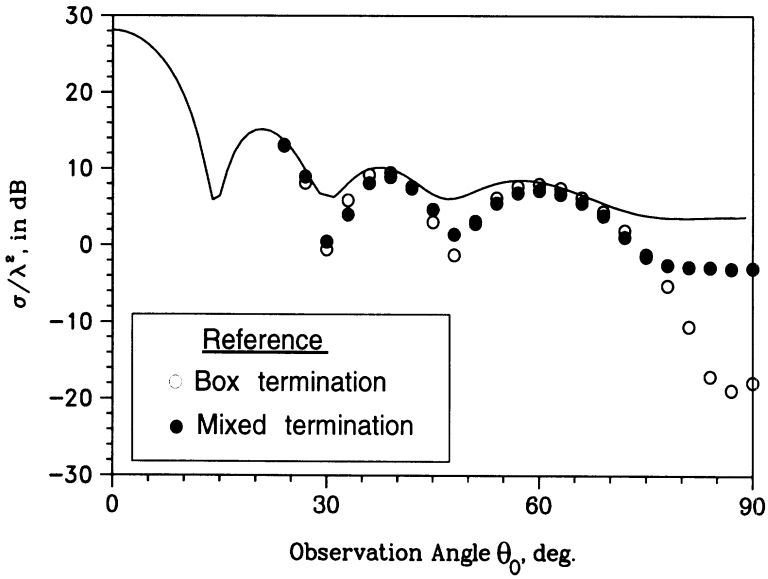
Backscatter Pattern of Metal Plate

This file (rect_plate_p0_hh.ps) and its associated input, output, and runtime data in ~femats/bench/rect_plate.

Rectangular PEC Plate Benchmark Target

3.5 λ x 2.0 λ Plate, ϕ = 90°
HH-Polarization

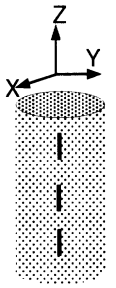


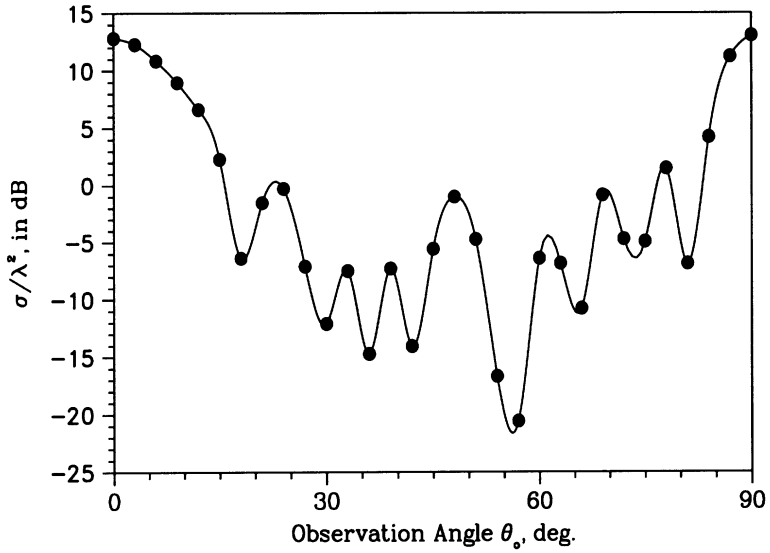


Backscatter Pattern of Metal Plate

This file (rect_plate_p90_hh.ps) and its associated input, output, and runtime data in ~femats/bench/rect_plate.

Foam Cylinder Benchmark Target, Co-Linear Wires





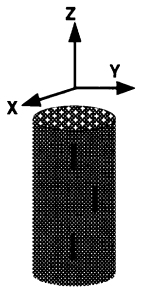
Backscatter Pattern of Foam Cylinder

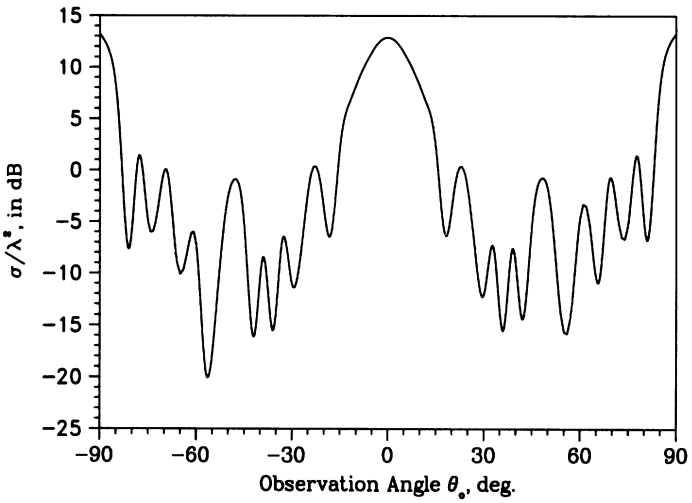
Cylinder Radius = 1.0 λ, Cylinder Height = 3.5 λ.
Three Wires of Length 0.5 λ, Spaced 0.5 λ Apart.

Cylindrical Mesh Termination Placed 0.45 λ Away.

This file (foam_cyl_colinear.ps) and its associated input, output, and runtime data in ~femats/bench/foam_cyl.

Foam Cylinder Benchmark Target, Wires in Echelon





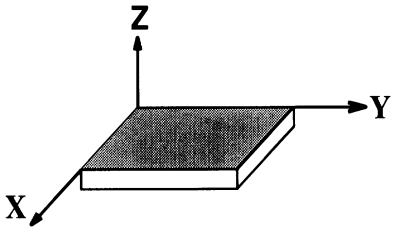
Backscatter Pattern of Foam Cylinder

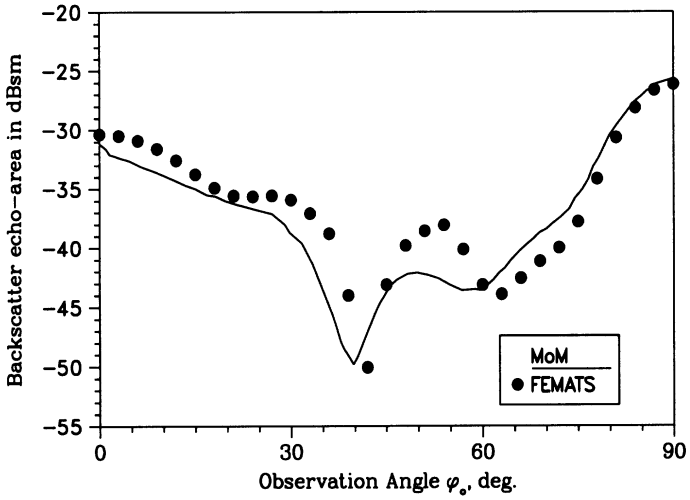
Cylinder Radius = 1.0 λ, Cylinder Height = 3.5 λ.
Three Wires of Length 0.5 λ, Spaced 0.5 λ Apart.

Cylindrical Mesh Termination Placed 0.45 λ Away.

This file (foam_cyl_echelon.ps) and its associated input, output, and runtime data in ~femats/bench/foam_cyl.

Glass Plate Benchmark Target





Backscatter pattern of glass plate

$\theta = 80^{o}$ conical cut ; $\varepsilon_r = 3 - j0.09$

Plate Dim.: 1.75 λ x 1.0 λ x 0.125 λ

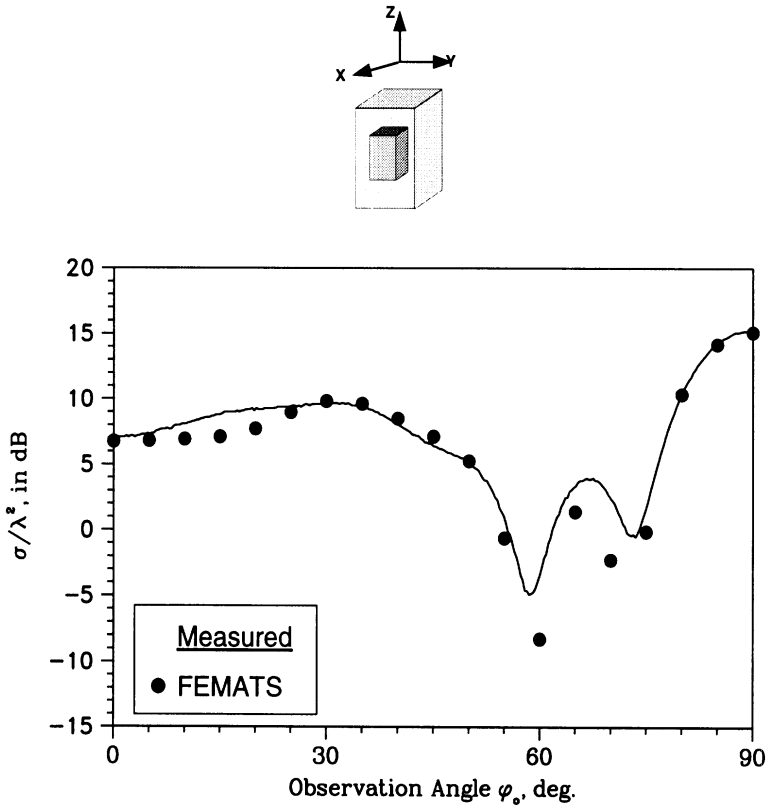
Mixed Mesh Termination Boundary

This file (glass_plate.ps) and its associated input, output, and runtime data in ~femats/bench/glass_plate.

Rectangular Inlet Benchmark Target

VV-Polarization

Rectangular Mesh Termination Boundary



Backscatter Pattern of Rectangular Inlet

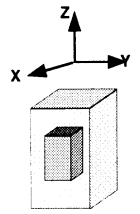
Inlet Dim.: 1.0 λ x 1.0 λ x 1.5 λ

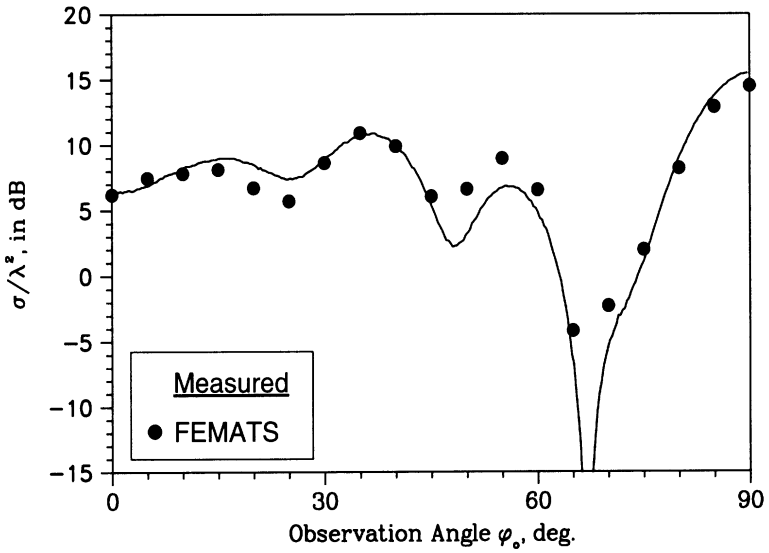
This file (rect_inlet_vv_r.ps) and its associated input, output, and runtime data in ~femats/bench/rect_inlet.

Rectangular Inlet Benchmark Target

HH-Polarization

Rectangular Mesh Termination Boundary





Backscatter Pattern of Rectangular Inlet

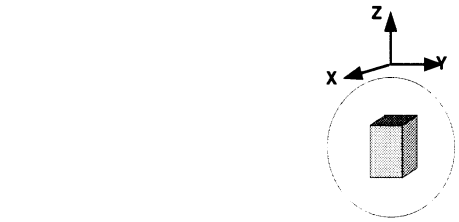
Inlet Dim.: 1.0 λ x 1.0 λ x 1.5 λ

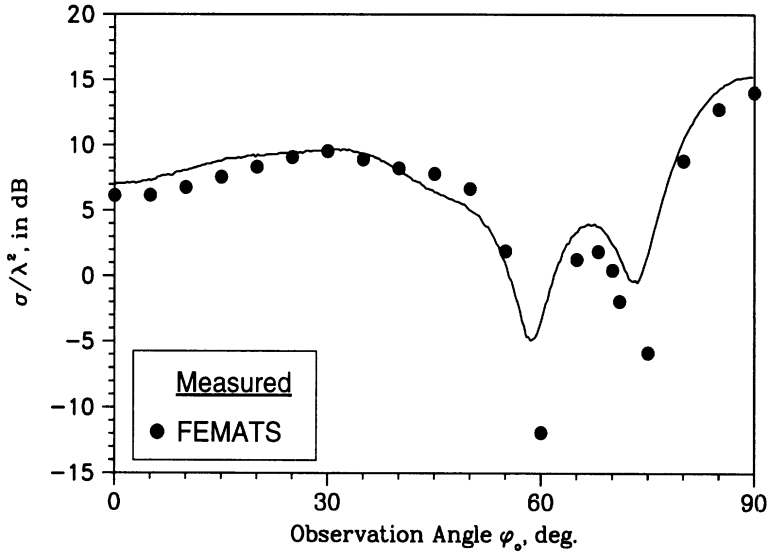
This file (rect_inlet_hh_r.ps) and its associated input, output, and runtime data in ~femats/bench/rect_inlet.

Rectangular Inlet Benchmark Target

VV-Polarization

Spherical Mesh Termination Boundary





Backscatter Pattern of Rectangular Inlet

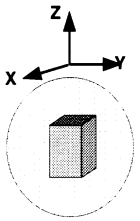
Inlet Dim.: 1.0 λ x 1.0 λ x 1.5 λ

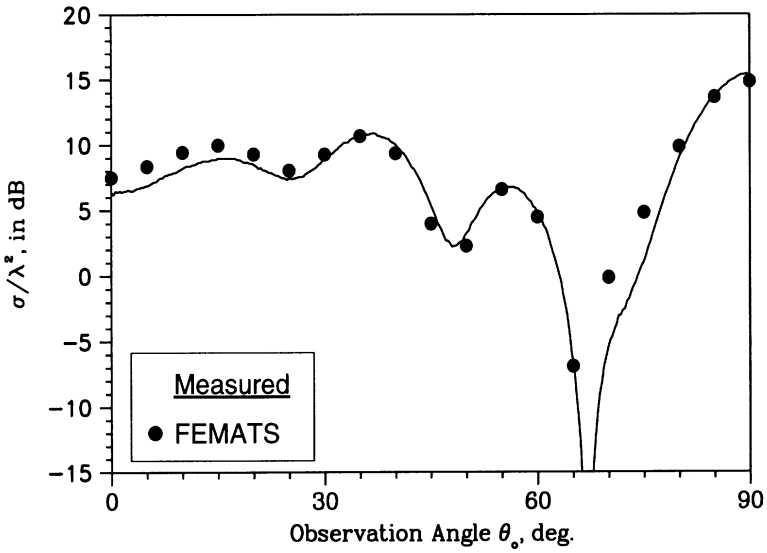
This file (rect_inlet_vv_s.ps) and its associated input, output, and runtime data in ~femats/bench/rect_inlet.

Rectangular Inlet Benchmark Target

HH-Polarization

Spherical Mesh Termination Boundary





Backscatter Pattern of Rectangular Inlet

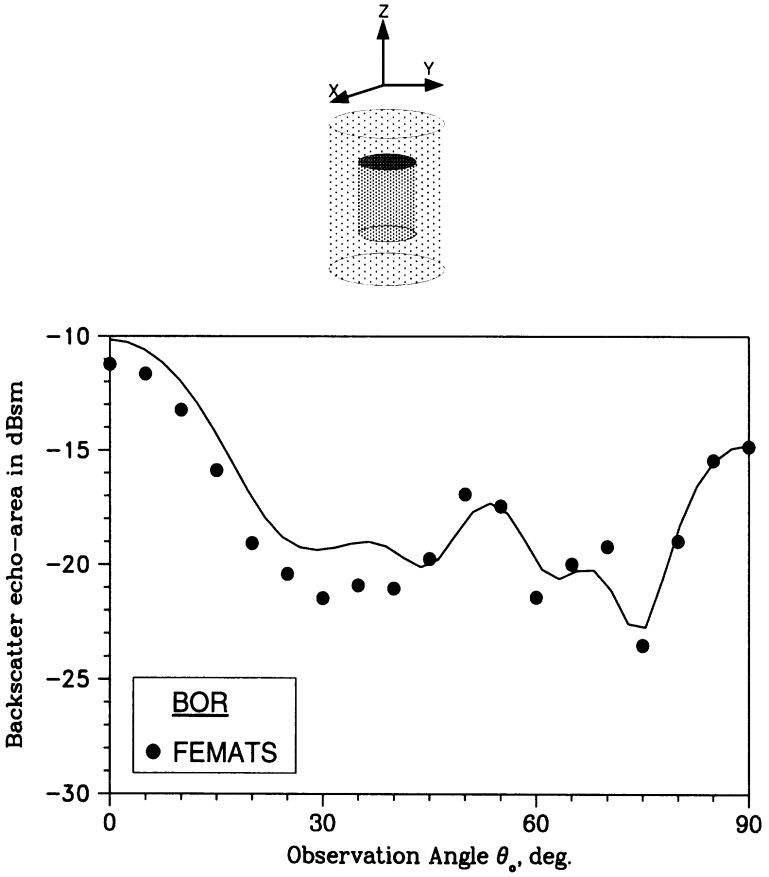
Inlet Dim.: 1.0 λ x 1.0 λ x 1.5 λ

This file (rect_inlet_hh_s.ps) and its associated input, output, and runtime data in ~femats/bench/rect_inlet.

Circular Inlet Benchmark Target

VV-Polarization

Cylindrical Mesh Termination Boundary



Backscatter Pattern of Circular Inlet

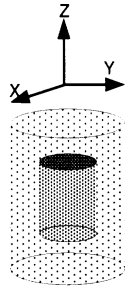
Inlet Dim.: $h = 1.875\ \lambda$, $dia = 1.25\ \lambda$

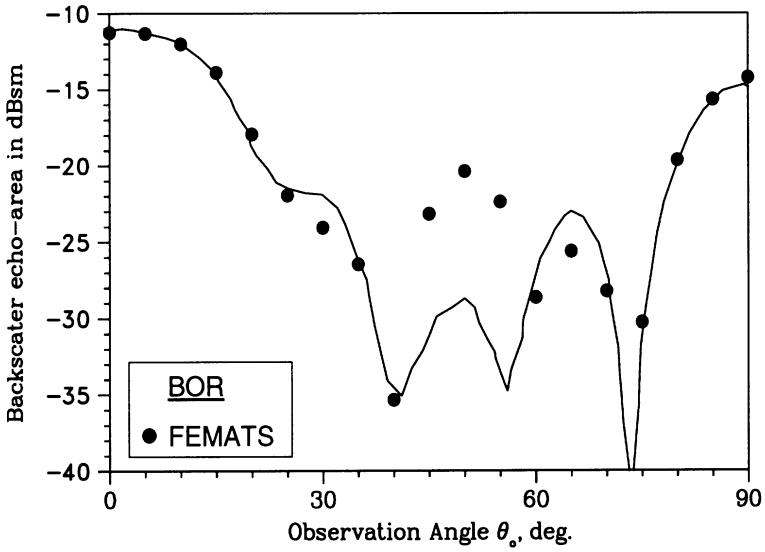
This file (circ_inlet_vv_c.ps) and its associated input, output, and runtime data in ~femats/bench/circ_inlet.

Circular Inlet Benchmark Target

HH-Polarization

Cylindrical Mesh Termination Boundary





Backscatter Pattern of Circular Inlet

Inlet Dim.: $h = 1.875\ \lambda$, $dia = 1.25\ \lambda$

This file (circ_inlet_hh_c.ps) and its associated input, output, and runtime data in ~femats/bench/circ_inlet.

Appendix D.F

Installation

FEMATS is designed to run on multiple computing platforms to best utilize various machine capabilities. Because of the large amount of time required to run FEMATS, it has been written to run on a supercomputer, while I-DEAS and most of the preprocessing programs only need to be run on a UNIX workstation. Hence there are two sets of source code included on the tape, along with two installation procedures. Also included is a small sample session, starting with the I-DEAS universal file, and ending with the FEMATS output files.

Note: While FEMATS was designed to run on a supercomputer, it may also run on the same workstation that performs the preprocessing, or any other machine (likewise for the preprocessors). Please see Section D.4 for more details.

Installation Instructions

1. Place the distribution tape in the tape drive. If the drive is not the default system drive, you will need to find out what device it is.

2. Retrieve the appropriate files from the tape. For example, if you wanted to install FEMATS in your home directory, you would say (assuming the tape drive being used is the system default tape drive):

   ```
   cd
   tar xv README femats.bench.tar.Z femats.doc.tar.Z
         femats.{arch}.tar femats.preproc.tar .
   ```

   where `{arch}` is one of the supported architectures: `cray`, `ksr`, or `paragon`.

   This places the named files in your home directory.

   There are seven files on the tape:

   ```
   README
   femats.bench.tar.Z
   femats.cray.tar.Z
   femats.doc.tar.Z
   femats.ksr.tar.Z
   femats.paragon.tar.Z
   femats.preproc.tar.Z
   ```

   `README` is a short description of the files on the tape.

   `femats.bench.tar.Z` is a compressed tar file containing the benchmark runs mentioned in Appendix E of this manual.

   `femats.cray.tar` is a tar file containing the source code and test files for the CRAY version of FEMATS.

   `femats.doc.tar.Z` is a compressed tar file containing the documentation for all of FEMATS (LaTeX and .ps formats).

   `femats.ksr.tar` is a tar file containing the source code and test files for the KSR version of FEMATS.

`femats.paragon.tar` is a tar file containing the source code and test files for the Intel Paragon version of FEMATS.

`femats.preproc.tar` is a tar file containing the source code and test files for the workstation-based portion of FEMATS.

3. ftp the supercomputer portion of FEMATS to the supercomputer, putting it in the appropriate directory. (If you are going to run both sections of code on the same machine, don't do this...)

4. If `femats.preproc.tar` is not in the directory where you want to install FEMATS, then put it there. **Note**: When the files are 'untar'd, a directory named `femats` will be created, and the appropriate files placed in it. (See Appendix G for a full file listing.)

5. Uncompress `femats.preproc.tar.Z`: type

```
uncompress femats.preproc.tar.Z
```

6. Untar `femats.preproc.tar`: type

```
tar xvf femats.preproc.tar
```

7. Change directories to `femats/src/preproc`, and type `make install`. This will compile the preprocessors, and place them in the `femats` directory. If you wish, you may then type `make clean` to remove the .o files.

8. Follow the same steps for the supercomputer, starting with step 4, and making sure to change `femats.preproc` to `femats.{arch}` in all cases.

9. For both the workstation and the supercomputer, FEMATS assumes that it will be run from the user's current working directory. To accomodate this, FEMAT's `bin` directory must be included in the search path. To do this, modify the appropriate startup file (the following assumes the C Shell, i.e. the `.cshrc` file):

```
set path=($path femats_dir/bin)
```

where `femats_dir` is the full path of the `femats` directory. For example,

```
set path=($path /l/usr/femats/bin) .
```

Then type `source .cshrc` to ensure that the new path takes effect. If any difficulties are encoutnered, ask you system/site administrator.

10. If any problems occur, don't hesitate to look in the scripts—they are quite simple, and there may be some machine or OS version dependencies that were missed...

Appendix D.G

Directory Listing of Full Distribution

```
femats:
total 9
drwxrwxrwx  7 mwnurnbe      512 Oct  5 10:36 .
drwx------  4 mwnurnbe      512 Oct  5 15:24 ..
-rw-r--r--  1 mwnurnbe     1308 Oct  3 16:10 README
drwxrwxrwx  7 mwnurnbe      512 Oct  5 11:56 bench
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:07 bin
drwxrwxrwx  2 mwnurnbe     1024 Oct  5 10:46 doc
drwxrwxrwx  6 mwnurnbe      512 Oct  5 10:41 src
drwxrwxrwx  4 mwnurnbe      512 Oct  5 09:10 test

femats/bench:
total 7
drwxrwxrwx  7 mwnurnbe      512 Oct  5 11:56 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 10:36 ..
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:46 circ_inlet
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:47 foam_cyl
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:51 glass_plate
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:52 rect_inlet
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:57 rect_plate

femats/bench/circ_inlet:
total 388
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:46 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 11:56 ..
-rw-r--r--  1 mwnurnbe   191099 May  5 12:37 circ_inlet_hh_c.ps
-rw-r--r--  1 mwnurnbe   180165 May  5 12:32 circ_inlet_vv_c.ps
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:46 cyl_term
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:46 rect_term

femats/bench/circ_inlet/cyl_term:
total 12285
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:46 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:46 ..
-rw-r--r--  1 mwnurnbe   660392 May  8 21:29 cntr
-rw-r--r--  1 mwnurnbe  2518518 May  8 21:29 cyl_inlt_c.unv
-rw-r--r--  1 mwnurnbe  2019142 May  8 21:29 edgy
-rw-r--r--  1 mwnurnbe       15 May  8 21:29 eg
-rw-r--r--  1 mwnurnbe  5603435 May  8 21:29 eglob
-rw-r--r--  1 mwnurnbe   697562 May  8 21:29 enoddy
-rw-r--r--  1 mwnurnbe   993240 May  8 21:29 esurfed
-rw-r--r--  1 mwnurnbe      166 May  8 21:29 ip_femats
-rw-r--r--  1 mwnurnbe       64 May  8 21:29 ip_mesh

femats/bench/circ_inlet/rect_term:
total 15949
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:46 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:46 ..
-rw-r--r--  1 mwnurnbe   849216 May  8 21:29 cntr
-rw-r--r--  1 mwnurnbe  3231558 May  8 21:29 cyl_inlet_b.unv
-rw-r--r--  1 mwnurnbe  2637600 May  8 21:29 edgy
-rw-r--r--  1 mwnurnbe       15 May  8 21:29 eg
-rw-r--r--  1 mwnurnbe  7372490 May  8 21:29 eglob
-rw-r--r--  1 mwnurnbe   880955 May  8 21:29 enoddy
-rw-r--r--  1 mwnurnbe  1294056 May  8 21:29 esurfed
-rw-r--r--  1 mwnurnbe      242 May  8 21:29 ip_femats
-rw-r--r--  1 mwnurnbe       65 May  8 21:29 ip_mesh

femats/bench/foam_cyl:
total 412
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:47 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 11:56 ..
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:47 colinear
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:51 echelon
-rw-r--r--  1 mwnurnbe   204989 May  4 19:05 foam_cyl_colinear.ps
-rw-r--r--  1 mwnurnbe   185065 May  4 19:00 foam_cyl_echelon.ps

femats/bench/foam_cyl/colinear:
total 33069
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:47 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:47 ..
-rw-r--r--  1 mwnurnbe  1738460 May  8 21:23 cntr
-rw-r--r--  1 mwnurnbe  5537161 May  8 21:23 edgy
-rw-r--r--  1 mwnurnbe       15 May  8 21:23 eg
-rw-r--r--  1 mwnurnbe 15792859 May  8 21:23 eglob
-rw-r--r--  1 mwnurnbe  1767211 May  8 21:23 enoddy
-rw-r--r--  1 mwnurnbe  2329948 May  8 21:23 esurfed
-rw-r--r--  1 mwnurnbe  6625155 May  8 21:23 f_cyl_.45.unv
-rw-r--r--  1 mwnurnbe      160 May  8 21:23 ip_femats
-rw-r--r--  1 mwnurnbe       66 May  8 21:23 ip_mesh

femats/bench/foam_cyl/echelon:
total 33197
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:51 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:47 ..
-rw-r--r--  1 mwnurnbe  1744840 May  8 21:24 cntr
-rw-r--r--  1 mwnurnbe  5556858 May  8 21:24 edgy
-rw-r--r--  1 mwnurnbe       15 May  8 21:24 eg
-rw-r--r--  1 mwnurnbe 15855216 May  8 21:24 eglob
-rw-r--r--  1 mwnurnbe  1769881 May  8 21:24 enoddy
-rw-r--r--  1 mwnurnbe  2338557 May  8 21:24 esurfed
-rw-r--r--  1 mwnurnbe  6647785 May  8 21:24 fom_off.unv
-rw-r--r--  1 mwnurnbe      163 May  8 21:24 ip_femats
-rw-r--r--  1 mwnurnbe       68 May  8 21:24 ip_mesh

femats/bench/glass_plate:
total 11741
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:51 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 11:56 ..
-rw-r--r--  1 mwnurnbe   600856 May  8 21:35 cntr
-rw-r--r--  1 mwnurnbe  1815397 May  8 21:35 edgy
-rw-r--r--  1 mwnurnbe       15 May  8 21:35 eg
-rw-r--r--  1 mwnurnbe  5105896 May  8 21:35 eglob
-rw-r--r--  1 mwnurnbe   641234 May  8 21:35 enoddy
-rw-r--r--  1 mwnurnbe  1226841 May  8 21:35 esurfed
-rw-r--r--  1 mwnurnbe   217865 May  5 10:39 glass_plate.ps
-rw-r--r--  1 mwnurnbe  2326058 May  8 21:35 gplt_rcs.unv
-rw-r--r--  1 mwnurnbe      332 May  8 21:35 ip_femats
-rw-r--r--  1 mwnurnbe       59 May  8 21:35 ip_mesh

femats/bench/rect_inlet:
total 676
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:52 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 11:56 ..
-rw-r--r--  1 mwnurnbe   157459 May  5 11:21 rect_inlet_hh_r.ps
-rw-r--r--  1 mwnurnbe   157728 May  5 11:18 rect_inlet_hh_s.ps
-rw-r--r--  1 mwnurnbe   157892 May  5 11:20 rect_inlet_vv_r.ps
-rw-r--r--  1 mwnurnbe   161102 May  5 11:15 rect_inlet_vv_s.ps
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:52 rect_term
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:52 sphere_term

femats/bench/rect_inlet/rect_term:
```

```
total 11661
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:52 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:52 ..
-rw-r--r--  1 mwnurnbe   625116 May  8 21:33 cntr
-rw-r--r--  1 mwnurnbe  1907209 May  8 21:33 edgy
-rw-r--r--  1 mwnurnbe       15 May  8 21:33 eg
-rw-r--r--  1 mwnurnbe  5269840 May  8 21:33 eglob
-rw-r--r--  1 mwnurnbe   642125 May  8 21:33 enoddy
-rw-r--r--  1 mwnurnbe  1038069 May  8 21:33 esurfed
-rw-r--r--  1 mwnurnbe      247 May  8 21:33 ip_femats
-rw-r--r--  1 mwnurnbe       62 May  8 21:33 ip_mesh
-rw-r--r--  1 mwnurnbe  2383439 May  8 21:33 rect.075.unv

femats/bench/rect_inlet/sphere_term:
total 17308
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:52 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:52 ..
-rw-r--r--  1 mwnurnbe  1341128 May  8 21:33 cntr
-rw-r--r--  1 mwnurnbe  3444638 May  8 21:33 edgy
-rw-r--r--  1 mwnurnbe       13 May  8 21:33 eg
-rw-r--r--  1 mwnurnbe  9319037 May  8 21:33 eglob
-rw-r--r--  1 mwnurnbe  2256561 May  8 21:33 enoddy
-rw-r--r--  1 mwnurnbe  1302251 May  8 21:33 esurfed
-rw-r--r--  1 mwnurnbe       98 May  8 21:33 ip_femats

femats/bench/rect_plate:
total 668
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:57 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 11:56 ..
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:57 box_term
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:58 mixed_term
-rw-r--r--  1 mwnurnbe   222419 May  5 09:45 rect_plate_p0_hh.ps
-rw-r--r--  1 mwnurnbe   218655 May  5 09:28 rect_plate_p0_vv.ps
-rw-r--r--  1 mwnurnbe   197611 May  5 09:55 rect_plate_p90_hh.ps

femats/bench/rect_plate/box_term:
total 10213
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:57 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:57 ..
-rwxr-xr-x  1 mwnurnbe  2105651 Oct  5 11:52 c_plt_box.45.unv
-rwxr-xr-x  1 mwnurnbe   551348 Oct  5 11:52 cntr
-rwxr-xr-x  1 mwnurnbe  1670445 Oct  5 11:52 edgy
-rwxr-xr-x  1 mwnurnbe       15 Oct  5 11:52 eg
-rwxr-xr-x  1 mwnurnbe  4513976 Oct  5 11:52 eglob
-rwxr-xr-x  1 mwnurnbe   578889 Oct  5 11:52 enoddy
-rwxr-xr-x  1 mwnurnbe   955160 Oct  5 11:52 esurfed
-rwxr-xr-x  1 mwnurnbe      215 Oct  5 11:52 ip_femats
-rwxr-xr-x  1 mwnurnbe       67 Oct  5 11:52 ip_mesh

femats/bench/rect_plate/mixed_term:
total 11021
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:58 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 11:57 ..
-rwxr-xr-x  1 mwnurnbe   594252 Oct  5 11:53 cntr
-rwxr-xr-x  1 mwnurnbe  2272118 Oct  5 11:53 cplt_mxd.unv
-rwxr-xr-x  1 mwnurnbe  1813873 Oct  5 11:53 edgy
-rwxr-xr-x  1 mwnurnbe       15 Oct  5 11:53 eg
-rwxr-xr-x  1 mwnurnbe  4921745 Oct  5 11:53 eglob
-rwxr-xr-x  1 mwnurnbe   628853 Oct  5 11:53 enoddy
-rwxr-xr-x  1 mwnurnbe   976573 Oct  5 11:53 esurfed
-rwxr-xr-x  1 mwnurnbe      324 Oct  5 11:53 ip_femats
-rwxr-xr-x  1 mwnurnbe       63 Oct  5 11:53 ip_mesh

femats/bin:
total 27
drwxrwxrwx  2 mwnurnbe      512 Oct  5 11:07 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 10:36 ..
-rwxr-xr-x  1 mwnurnbe     4547 Oct  5 09:50 femats.cray
-rwxr-xr-x  1 mwnurnbe     5319 Oct  5 11:07 femats.ksr
-rwxr-xr-x  1 mwnurnbe     5354 Oct  5 10:30 femats.paragon
-rwxr-xr-x  1 mwnurnbe     7614 Oct  5 08:47 femats.preproc

femats/doc:
total 5010
drwxrwxrwx  2 mwnurnbe     1024 Oct  5 10:46 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 10:36 ..
-rw-r--r--  1 mwnurnbe   191099 Sep 26 14:51 circ_inlet_hh_c.ps
-rw-r--r--  1 mwnurnbe   180165 Sep 26 14:51 circ_inlet_vv_c.ps
-rw-r--r--  1 mwnurnbe     3695 Sep 26 14:51 f.ps
-rw-r--r--  1 mwnurnbe     7584 Sep 26 14:51 flow.ps
-rw-r--r--  1 mwnurnbe   204989 Sep 26 14:51 foam_cyl_colinear.ps
-rw-r--r--  1 mwnurnbe   185065 Sep 26 14:51 foam_cyl_echelon.ps
-rw-r--r--  1 mwnurnbe   217865 Sep 26 14:51 glass_plate.ps
-rw-r--r--  1 mwnurnbe     1129 Sep 26 14:51 macros.tex
-rw-r--r--  1 mwnurnbe     2921 Sep 26 14:51 manual.aux
-rw-r--r--  1 mwnurnbe    80888 Sep 26 14:51 manual.dvi
-rw-r--r--  1 mwnurnbe    29460 Sep 26 14:51 manual.log
-rw-r--r--  1 mwnurnbe  2508214 Sep 26 14:51 manual.ps
-rw-r--r--  1 mwnurnbe    32231 Sep 26 14:51 manual.tex
-rw-r--r--  1 mwnurnbe     1604 Sep 26 14:51 manual.toc
-rw-r--r--  1 mwnurnbe    32562 Sep 26 14:51 manual1.tex
-rw-r--r--  1 mwnurnbe   157459 Sep 26 14:51 rect_inlet_hh_r.ps
-rw-r--r--  1 mwnurnbe   157728 Sep 26 14:51 rect_inlet_hh_s.ps
-rw-r--r--  1 mwnurnbe   157892 Sep 26 14:51 rect_inlet_vv_r.ps
-rw-r--r--  1 mwnurnbe   161102 Sep 26 14:51 rect_inlet_vv_s.ps
-rw-r--r--  1 mwnurnbe   222419 Sep 26 14:51 rect_plate_p0_hh.ps
-rw-r--r--  1 mwnurnbe   218655 Sep 26 14:51 rect_plate_p0_vv.ps
-rw-r--r--  1 mwnurnbe   197611 Sep 26 14:51 rect_plate_p90_hh.ps
-rw-r--r--  1 mwnurnbe       24 Sep 26 14:51 sngl_side.pro

femats/src:
total 6
drwxrwxrwx  6 mwnurnbe      512 Oct  5 10:41 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 10:36 ..
drwxrwxrwx  4 mwnurnbe      512 Oct  5 10:38 cray
drwxrwxrwx  4 mwnurnbe      512 Oct  5 10:39 ksr
drwxrwxrwx  5 mwnurnbe      512 Oct  5 10:40 paragon
drwxrwxrwx  2 mwnurnbe      512 Oct  4 20:49 preproc

femats/src/cray:
total 42
drwxrwxrwx  4 mwnurnbe      512 Oct  5 10:38 .
drwxrwxrwx  6 mwnurnbe      512 Oct  5 10:41 ..
-rw-r--r--  1 mwnurnbe     1789 Oct  4 16:33 Makefile
drwxrwxrwx  2 mwnurnbe      512 Oct  4 14:56 asc2bin
-rw-r--r--  1 mwnurnbe     5177 Sep 16 19:20 bicg.F
-rw-r--r--  1 mwnurnbe     1046 Sep 19 14:44 diag.F
-rw-r--r--  1 mwnurnbe    13065 Sep 26 11:04 fem.F
-rw-r--r--  1 mwnurnbe       94 Sep 26 11:03 fem_data.h
-rw-r--r--  1 mwnurnbe     1082 Sep 19 14:32 jaggd.F
-rw-r--r--  1 mwnurnbe     6332 Sep 16 19:20 k2.F
drwxrwxrwx  2 mwnurnbe      512 Oct  4 14:56 sub
```

```
-rw-r--r--  1 mwnurnbe     4160 Sep 19 14:33 xc.F

femats/src/cray/asc2bin:
total 4
drwxrwxrwx  2 mwnurnbe      512 Oct  4 14:56 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 10:38 ..
-rw-r--r--  1 mwnurnbe     1563 Sep 26 11:03 fr.f

femats/src/cray/sub:
total 74
drwxrwxrwx  2 mwnurnbe      512 Oct  4 14:56 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 10:38 ..
-rw-r--r--  1 mwnurnbe     1980 Sep 25 23:18 basis1.f
-rw-r--r--  1 mwnurnbe    10618 Sep 16 19:20 bd1.f
-rw-r--r--  1 mwnurnbe     4143 Sep 19 14:31 bi2mono.f
-rw-r--r--  1 mwnurnbe      820 Sep 16 19:20 calc1.f
-rw-r--r--  1 mwnurnbe     1507 Sep 16 19:20 comput.f
-rw-r--r--  1 mwnurnbe      928 Sep 16 19:20 crux.f
-rw-r--r--  1 mwnurnbe     1383 Sep 25 23:18 cruxd1.f
-rw-r--r--  1 mwnurnbe      908 Sep 19 14:31 f11.f
-rw-r--r--  1 mwnurnbe    13576 Sep 19 14:31 fcmb.f
-rw-r--r--  1 mwnurnbe     2600 Sep 19 14:31 finc.f
-rw-r--r--  1 mwnurnbe      801 Sep 19 14:31 heapsort.f
-rw-r--r--  1 mwnurnbe     2182 Sep 19 14:31 incc1.f
-rw-r--r--  1 mwnurnbe     2108 Sep 19 14:32 incd1.f
-rw-r--r--  1 mwnurnbe     2247 Sep 19 14:32 inci.f
-rw-r--r--  1 mwnurnbe     2311 Sep 19 14:32 incr.f
-rw-r--r--  1 mwnurnbe     1547 Sep 19 14:32 norm2d.f
-rw-r--r--  1 mwnurnbe     2458 Sep 19 14:32 norma.f
-rw-r--r--  1 mwnurnbe     1359 Sep 19 14:32 ops.f
-rw-r--r--  1 mwnurnbe      560 Sep 19 14:32 ord.f
-rw-r--r--  1 mwnurnbe      625 Sep 19 14:32 sort.f
-rw-r--r--  1 mwnurnbe      354 Sep 19 14:32 string.f
-rw-r--r--  1 mwnurnbe     1534 Sep 19 14:32 surfint1.f
-rw-r--r--  1 mwnurnbe     3371 Sep 19 14:32 value.f
-rw-r--r--  1 mwnurnbe      439 Sep 19 14:32 volume.f

femats/src/ksr:
total 58
drwxrwxrwx  4 mwnurnbe      512 Oct  5 10:39 .
drwxrwxrwx  6 mwnurnbe      512 Oct  5 10:41 ..
-rw-r--r--  1 mwnurnbe     1748 Oct  4 15:02 Makefile
drwxrwxrwx  2 mwnurnbe      512 Oct  4 13:53 asc2bin
-rw-r--r--  1 mwnurnbe    11026 Oct  3 14:37 bd1.F
-rw-r--r--  1 mwnurnbe     8441 Oct  3 14:37 bicg.F
-rw-r--r--  1 mwnurnbe     1076 Oct  3 14:38 diag.F
-rw-r--r--  1 mwnurnbe    14590 Oct  3 14:35 fem.F
-rw-r--r--  1 mwnurnbe       98 Oct  3 15:01 fem_data.h
-rw-r--r--  1 mwnurnbe     6665 Oct  3 14:37 k2.F
-rw-r--r--  1 mwnurnbe     1658 Oct  3 14:38 mult.F
drwxrwxrwx  2 mwnurnbe      512 Oct  4 13:53 sub
-rw-r--r--  1 mwnurnbe     4163 Oct  3 14:38 xc.F

femats/src/ksr/asc2bin:
total 4
drwxrwxrwx  2 mwnurnbe      512 Oct  4 13:53 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 10:39 ..
-rw-r--r--  1 mwnurnbe     1563 Oct  3 15:10 fr.f

femats/src/ksr/sub:
total 65
drwxrwxrwx  2 mwnurnbe      512 Oct  4 13:53 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 10:39 ..
-rw-r--r--  1 mwnurnbe     2298 Oct  3 14:39 basis1.F
-rw-r--r--  1 mwnurnbe     4572 Oct  3 14:41 bi2mono.F
-rw-r--r--  1 mwnurnbe      820 Oct  3 14:39 calc1.F
-rw-r--r--  1 mwnurnbe     1507 Oct  3 14:39 comput.F
-rw-r--r--  1 mwnurnbe      968 Oct  3 14:39 crux.F
-rw-r--r--  1 mwnurnbe     1351 Oct  3 14:39 cruxd1.F
-rw-r--r--  1 mwnurnbe      908 Oct  3 14:40 f11.F
-rw-r--r--  1 mwnurnbe    13589 Oct  3 14:41 fcmb.F
-rw-r--r--  1 mwnurnbe     2419 Oct  3 14:41 finc.F
-rw-r--r--  1 mwnurnbe     1210 Oct  3 14:41 hpsrt.F
-rw-r--r--  1 mwnurnbe     2182 Oct  3 14:41 incc1.F
-rw-r--r--  1 mwnurnbe     1914 Oct  3 14:41 incd1.F
-rw-r--r--  1 mwnurnbe     2247 Oct  3 14:41 inci.F
-rw-r--r--  1 mwnurnbe     2311 Oct  3 14:41 incr.F
-rw-r--r--  1 mwnurnbe     1547 Oct  3 14:42 norm2d.F
-rw-r--r--  1 mwnurnbe     2458 Oct  3 14:42 norma.F
-rw-r--r--  1 mwnurnbe     1359 Oct  3 14:42 ops.F
-rw-r--r--  1 mwnurnbe      560 Oct  3 14:42 ord.F
-rw-r--r--  1 mwnurnbe      625 Oct  3 14:43 sort.F
-rw-r--r--  1 mwnurnbe      354 Oct  3 14:43 string.F
-rw-r--r--  1 mwnurnbe     1534 Oct  3 14:43 surfint1.F
-rw-r--r--  1 mwnurnbe     4838 Oct  3 14:43 value.F
-rw-r--r--  1 mwnurnbe      410 Oct  3 14:43 volume.F

femats/src/paragon:
total 9
drwxrwxrwx  5 mwnurnbe      512 Oct  5 10:40 .
drwxrwxrwx  6 mwnurnbe      512 Oct  5 10:41 ..
-rw-r--r--  1 mwnurnbe     2106 Oct  5 10:29 Makefile
drwxrwxrwx  2 mwnurnbe      512 Oct  4 20:45 asc2bin
-rw-r--r--  1 mwnurnbe      462 Oct  4 16:02 fem_data.h
drwxrwxrwx  2 mwnurnbe      512 Oct  4 16:02 intel
drwxrwxrwx  2 mwnurnbe      512 Oct  4 16:02 intel-src

femats/src/paragon/asc2bin:
total 7
drwxrwxrwx  2 mwnurnbe      512 Oct  4 20:45 .
drwxrwxrwx  5 mwnurnbe      512 Oct  5 10:40 ..
-rw-r-----  1 mwnurnbe      462 Sep 26 11:10 fem_data.h
-rw-r-----  1 mwnurnbe     3709 Sep 26 11:10 fr.f

femats/src/paragon/intel:
total 70
drwxrwxrwx  2 mwnurnbe      512 Oct  4 16:02 .
drwxrwxrwx  5 mwnurnbe      512 Oct  5 10:40 ..
-rw-r--r--  1 mwnurnbe    10796 Sep 26 11:09 bd1.f
-rw-r--r--  1 mwnurnbe     4202 Sep 26 11:09 bicg.f
-rw-r--r--  1 mwnurnbe      592 Sep 26 11:09 broadcast_scalar.f
-rw-r--r--  1 mwnurnbe      735 Sep 26 11:09 collect_vector.f
-rw-r--r--  1 mwnurnbe      939 Sep 26 11:09 diag.f
-rw-r--r--  1 mwnurnbe     4770 Sep 26 11:09 distribute_matrix.f
-rw-r--r--  1 mwnurnbe     1126 Sep 26 11:09 distribute_vector.f
-rw-r--r--  1 mwnurnbe    15595 Sep 26 11:09 fem.f
-rw-r--r--  1 mwnurnbe     1765 Sep 26 11:09 gather_data.f
-rw-r--r--  1 mwnurnbe     6611 Sep 26 11:09 k2.f
-rw-r--r--  1 mwnurnbe     3614 Sep 26 11:09 make_fetch_send_list.f
-rw-r--r--  1 mwnurnbe     1090 Sep 26 11:10 mult.f
-rw-r--r--  1 mwnurnbe     4944 Sep 26 11:10 support.f
-rw-r--r--  1 mwnurnbe      107 Sep 26 11:10 user_seconds.f
```

```
-rw-r--r--  1 mwnurnbe     4272 Sep 26 11:10 xc.f

femats/src/paragon/intel-src:
total 62
drwxrwxrwx  2 mwnurnbe      512 Oct  4 16:02 .
drwxrwxrwx  5 mwnurnbe      512 Oct  5 10:40 ..
-rw-r--r--  1 mwnurnbe     2298 Sep 26 11:13 basis1.F
-rw-r--r--  1 mwnurnbe     4395 Sep 26 11:13 bi2mono.F
-rw-r--r--  1 mwnurnbe      820 Sep 26 11:13 calc1.F
-rw-r--r--  1 mwnurnbe     1507 Sep 26 11:13 comput.F
-rw-r--r--  1 mwnurnbe      968 Sep 26 11:13 crux.F
-rw-r--r--  1 mwnurnbe     1386 Sep 26 11:19 cruxd1.F
-rw-r--r--  1 mwnurnbe      908 Sep 26 11:13 f11.F
-rw-r--r--  1 mwnurnbe    13589 Sep 26 11:13 fcmb.F
-rw-r--r--  1 mwnurnbe     2600 Sep 26 11:13 finc.F
-rw-r--r--  1 mwnurnbe     2130 Sep 26 11:13 incc1.F
-rw-r--r--  1 mwnurnbe     2108 Sep 26 11:13 incd1.F
-rw-r--r--  1 mwnurnbe     2247 Sep 26 11:13 inci.F
-rw-r--r--  1 mwnurnbe     2311 Sep 26 11:13 incr.F
-rw-r--r--  1 mwnurnbe     1547 Sep 26 11:13 norm2d.F
-rw-r--r--  1 mwnurnbe     2458 Sep 26 11:13 norma.F
-rw-r--r--  1 mwnurnbe     1359 Sep 26 11:13 ops.F
-rw-r--r--  1 mwnurnbe      560 Sep 26 11:13 ord.F
-rw-r--r--  1 mwnurnbe      625 Sep 26 11:13 sort.F
-rw-r--r--  1 mwnurnbe      354 Sep 26 11:13 string.F
-rw-r--r--  1 mwnurnbe     1534 Sep 26 11:13 surfint1.F
-rw-r--r--  1 mwnurnbe     2351 Sep 26 11:13 value.F
-rw-r--r--  1 mwnurnbe      439 Sep 26 11:13 volume.F

femats/src/preproc:
total 60
drwxrwxrwx  2 mwnurnbe      512 Oct  4 20:49 .
drwxrwxrwx  6 mwnurnbe      512 Oct  5 10:41 ..
-rw-r--r--  1 mwnurnbe      682 Oct  4 14:48 Makefile
-rw-r--r--  1 mwnurnbe    19856 Oct  3 13:46 c2p.f
-rw-r--r--  1 mwnurnbe    22608 Oct  3 13:39 c2p_2d.f
-rw-r--r--  1 mwnurnbe     3702 Oct  3 13:39 count.f
-rw-r--r--  1 mwnurnbe      164 May  8 21:45 parmvl
-rw-r--r--  1 mwnurnbe     8956 Oct  4 14:43 u2c.f

femats/test:
total 4
drwxrwxrwx  4 mwnurnbe      512 Oct  5 09:10 .
drwxrwxrwx  7 mwnurnbe      512 Oct  5 10:36 ..
drwxrwxrwx  2 mwnurnbe      512 Oct  5 15:21 preproc
drwxrwxrwx  2 mwnurnbe     1024 Oct  5 15:21 supercomp

femats/test/preproc:
total 983
drwxrwxrwx  2 mwnurnbe      512 Oct  5 15:21 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 09:10 ..
-rw-r--r--  1 mwnurnbe    37756 Oct  4 19:57 small_plate.cntr
-rw-r--r--  1 mwnurnbe   195800 Oct  4 19:57 small_plate.cnv
-rw-r--r--  1 mwnurnbe      308 Oct  4 19:57 small_plate.data
-rw-r--r--  1 mwnurnbe    93477 Oct  4 19:57 small_plate.edgy
-rw-r--r--  1 mwnurnbe       12 Oct  4 19:57 small_plate.eg
-rw-r--r--  1 mwnurnbe   238485 Oct  4 19:57 small_plate.eglob
-rw-r--r--  1 mwnurnbe    46232 Oct  4 19:57 small_plate.enoddy
-rw-r--r--  1 mwnurnbe    50541 Oct  4 19:57 small_plate.esurfed
-rw-r--r--  1 mwnurnbe     4481 Oct  4 19:57 small_plate.grp
-rw-r--r--  1 mwnurnbe      251 Oct  4 19:57 small_plate.otpt
-rw-r--r--  1 mwnurnbe   286783 Oct  4 19:57 small_plate.unv
-rw-r--r--  1 mwnurnbe     3903 Oct  4 19:57 transcript.preproc

femats/test/supercomp:
total 19649
drwxrwxrwx  2 mwnurnbe     1024 Oct  5 15:21 .
drwxrwxrwx  4 mwnurnbe      512 Oct  5 09:10 ..
-rw-r--r--  1 mwnurnbe     1950 Oct  5 09:40 bis.p0.0
-rw-r--r--  1 mwnurnbe     1950 Oct  5 09:40 bis.p0.90
-rw-r-----  1 mwnurnbe       12 Oct  5 09:10 eg
-rw-r--r--  1 mwnurnbe       60 Oct  5 09:40 input.p0.0
-rw-r--r--  1 mwnurnbe       61 Oct  5 09:40 input.p0.90
-rw-r-----  1 mwnurnbe    37756 Oct  5 09:10 small_plate.cntr
-rw-r-----  1 mwnurnbe      308 Oct  5 09:10 small_plate.data
-rw-r-----  1 mwnurnbe    93477 Oct  5 09:10 small_plate.edgy
-rw-r-----  1 mwnurnbe       12 Oct  5 09:10 small_plate.eg
-rw-r-----  1 mwnurnbe   238485 Oct  5 09:10 small_plate.eglob
-rw-r-----  1 mwnurnbe    46232 Oct  5 09:10 small_plate.enoddy
-rw-r-----  1 mwnurnbe    51793 Oct  5 09:10 small_plate.esurfed
-rw-r-----  1 mwnurnbe       44 Oct  5 09:10 small_plate.in
-rw-r-----  1 mwnurnbe      251 Oct  5 09:10 small_plate.otpt
-rw-r-----  1 mwnurnbe       22 Oct  5 09:10 small_plate.otpt.new
-rw-r-----  1 mwnurnbe 11200008 Oct  5 09:10 test1.dat
-rw-r-----  1 mwnurnbe  1960008 Oct  5 09:10 test2.dat
-rw-r-----  1 mwnurnbe  3920008 Oct  5 09:10 test3.dat
-rw-r-----  1 mwnurnbe  1400008 Oct  5 09:10 test4.dat
-rw-r-----  1 mwnurnbe  1080008 Oct  5 09:10 test5.dat
-rw-r-----  1 mwnurnbe      913 Oct  5 09:10 transcript.ksr
```

Appendix D.H

References

1. A. Chatterjee, J.M. Jin and J.L. Volakis, "Application of edge-based finite elements and ABCs to 3-D scattering," *IEEE Trans. Antennas Propagat.*, vol. 41, pp. 221–26, February 1993.

2. D.R. Kincaid and T.C. Oppe, "ITPACK on supercomputers," *Numerical Methods, Lecture Notes in Mathematics*, vol. 1005, pp. 151–61, Springer, Berlin, 1982.

Appendix E

Earlier FEMATS Documentation

Progress on the Development of FEMATS

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Abstract

This report presents a summary of the improvements to the FEMATS code since the last issue of the manual (U-M Report 03115-3-T, April 1994). The upgraded FEMATS code incorporates new scripts which simplify the porting, integration, and utility of the pre-processor. Most importantly, FEMATS is now integrated with it's own prismatic meshers, which are simple to use and incorporates with it's own interface. The option to use SDRC I-DEAS is still available. A most important upgrade to the FEMATS code is the incorporation of a new mesh termination scheme using artificial absorbers and this makes possible the use of conformal mesh truncation surfaces. This new absorber is tested by showing calculations for the almond EMCC benchmark.

E.1 Introduction

The numerous revisions which have been made to FEMATS include the porting of the code to an HP 9000 workstation, refinement of the preprocessor I/O, and the development of a single script file which initiates all of the preprocessor and main processor programs. Both a tutorial mesh generator and an automatic prismatic mesh generator have been added. Also an optional mesh truncation scheme, Finite Element Method - Artificial Absorber (FEM-AA), has been implemented.

E.2 Workstation version

Although FEMATS was originally designed to run on a variety of supercomputer architectures, the main processor program was written such that it could peacefully co-exist with the preprocessors, etc., on the workstation. Thus after a number of minor changes, the source code for the Cray was converted to run on an HP 9000 workstation. Necessary changes were made to the `Makefile`, which is used to compile the source code and install the executable program of the main processor. Each of the real and complex variables and arrays are declared as double precision during compilation, in an effort to maintain the inherent extended precision of the supercomputers. Also, the array dimensions were reduced to account for the reduced available disk space on the workstation. These dimensions can be readily changed in the parameter file `fem_data.h` to reflect the size of a particular geometry or the available space on a particular machine, and the procedure to do so is described in the revised User's Manual. If any of the array dimensions are too small for a given geometry, an overflow error will be given.

The workstation version of FEMATS has been verified and for a system with 9712 unknowns the CPU per iteration was less than 0.2 seconds on an HP 9000/715. It was found that although the conversion to double precision slowed the program down, the convergence rate increased, and the resultant run-time was approximately the same as when using only single precision.

E.3 Preprocessor refinement

Considerable refinements have been made to the preprocessor programs of FEMATS to increase the efficiency of the user interface. The input data requirements have been minimized, reduced by about 50%. This was accomplished by extracting all of the pertinent geometry related information from the universal file which is unchanged from run to run. The input parameters entered during each run-time are then only the desired tolerance, maximum number of iterations, aspect parameters (type of pattern, etc.), and material properties which the user may wish to vary for each run. The I/O of the preprocessors has been consolidated, and a number of the prompts have been made more self-explanatory. In addition, overflow checks for the array dimensions have been added at necessary points to prevent an erroneous run from taking place.

E.4 Script file

The user interface for FEMATS has been changed extensively. A single script file is now used to initiate all of the preprocessing and main processing programs. The only exception is if the final processing is to be done on a different machine. In most cases this would be a supercomputer, and the preprocessing would be done on a workstation. This requires that a second script be started on the supercomputer once the geometry and run-time data files have been transferred. This second script

can be easily modified to account for machine specific dependencies, to automatically submit the job to a batch queue, etc.

Using the script files in this way increases the user friendliness of the interface since running FEMATS requires a series of steps for its completion. For example, the script file checks whether or not the preprocessing has been done already and skips that step if it is not necessary to repeat it. Also within the script some file management is done, such as deleting unnecessary files or compressing others when appropriate. This was of particular concern for the workstation version, since the geometry mesh files can consume considerable amounts of disk space, especially if numerous geometries are being processed at the same time. If the final processing is to be done on a different machine, then the script will `tar` and `compress` all of the required data files, producing a single file for ease of transfer.

Another distinguishing feature is that the prompting for the input parameters is now done by a separate file initiated after the completion of the preprocessing and not from the main processor program. In this manner, the final processing is completely noninteractive. This change was made so that all of the user input could be done on the workstation for the cases when the final processing is to be done on a supercomputer. The primary motivation for this was that the eventual implementation of the GUI will require that all of it's interfacing be done within the workstation environment. Thus the time and effort was invested for this as well as a portion of the aforementioned modifications to prepare FEMATS for the development of the GUI.

E.5 Tutorial Mesh Generator

The development of a mesh for a given geometry typically requires a large portion of the time devoted to completing the entire FEM process. Therefore, to free the first time user from the time consuming burden of generating meshes and to enable them to focus on the operation of FEMATS itself, a tutorial mesh generator was developed for a select number of the benchmark test cases.

This mesh generator is based on a structured mesh approach (vs. a free mesh approach) which utilizes prismatic elements. Volume meshes are generated for rectangular, cylindrical, or spherical regions containing simple geometries which readily adhere to these coordinate systems. The geometries which can currently be meshed automatically are as follows:

1. PEC rectangular plate: flat
2. Dielectric rectangular plate: finite thickness
3. PEC rectangular inlet: dielectric filled
4. Dielectric cylinder
5. PEC circular inlet: dielectric filled
6. PEC sphere

Upon selecting the geometry, the required input is simply the dimensions of the geometry and mesh termination and the average element dimension (typically 0.075–0.085λ). The first step of the code is to triangularize the surface mesh—a planar surface for the rectangular and cylindrical regions or a closed surface for the spherical region—which contains an appropriate layer or cross section of the structure. Once generated, prisms are grown from this surface, and the appropriate element faces are selected to identify the given geometry. Examples of the three types of structured meshes are shown in Figs. E.1 through E.3, which include both the surface triangularization and the grown volume

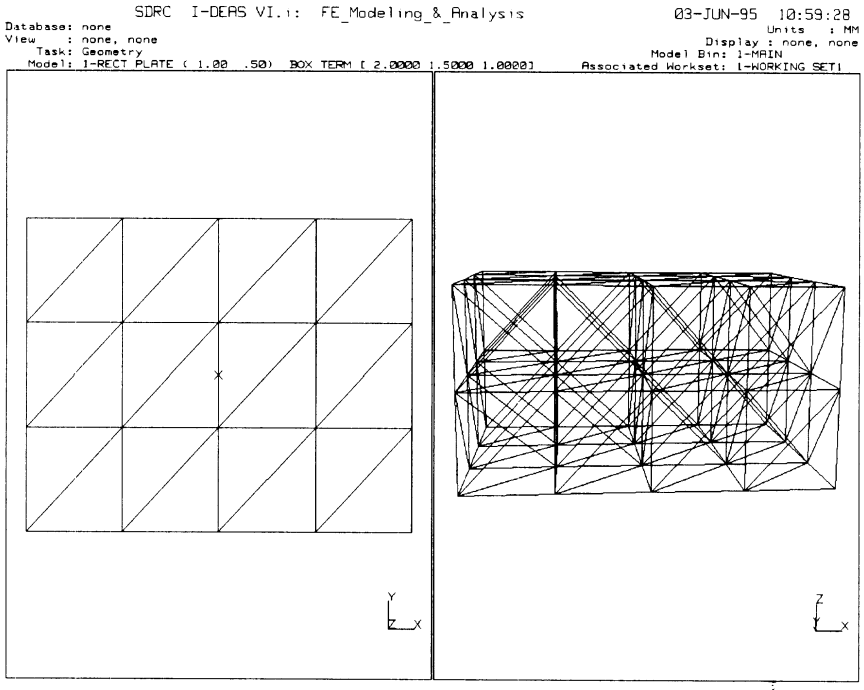


Figure E.1: Structured mesh for a rectangular region.

mesh. Since at this time FEMATS can only handle tetrahedral elements, the prisms are further divided into tetrahedrals, each prism giving three of them. This growth and subsequent division of the prisms is an extremely efficient process due to the structured nature of the mesh.

The tutorial mesh generator automatically outputs the FEM mesh in the particular Universal file format required by FEMATS. The generated mesh can be viewed by any graphics software which accepts the Universal file format, e.g. I-DEAS. The user then simply needs to continue with the

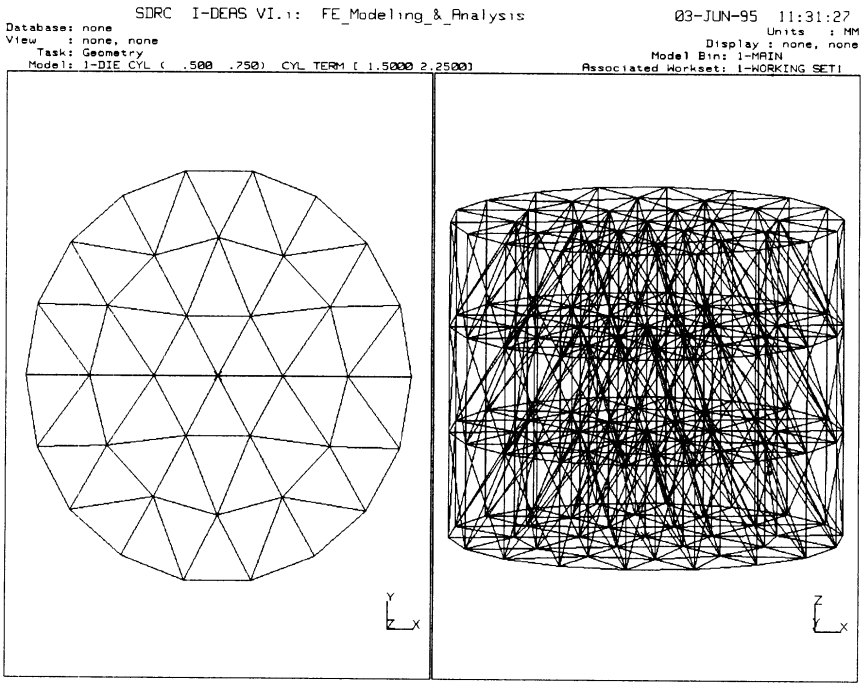


Figure E.2: Structured mesh for a cylindrical region.

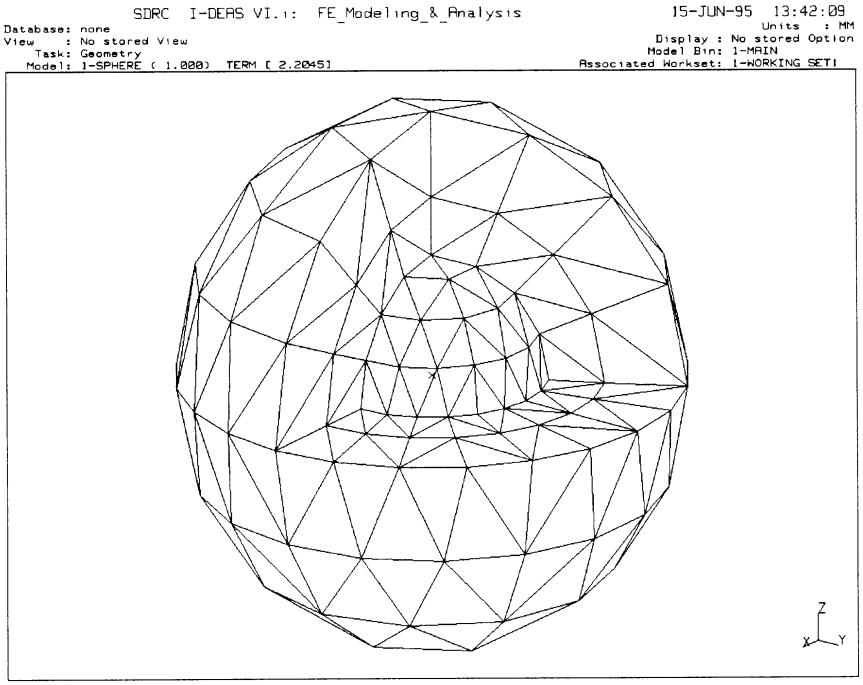
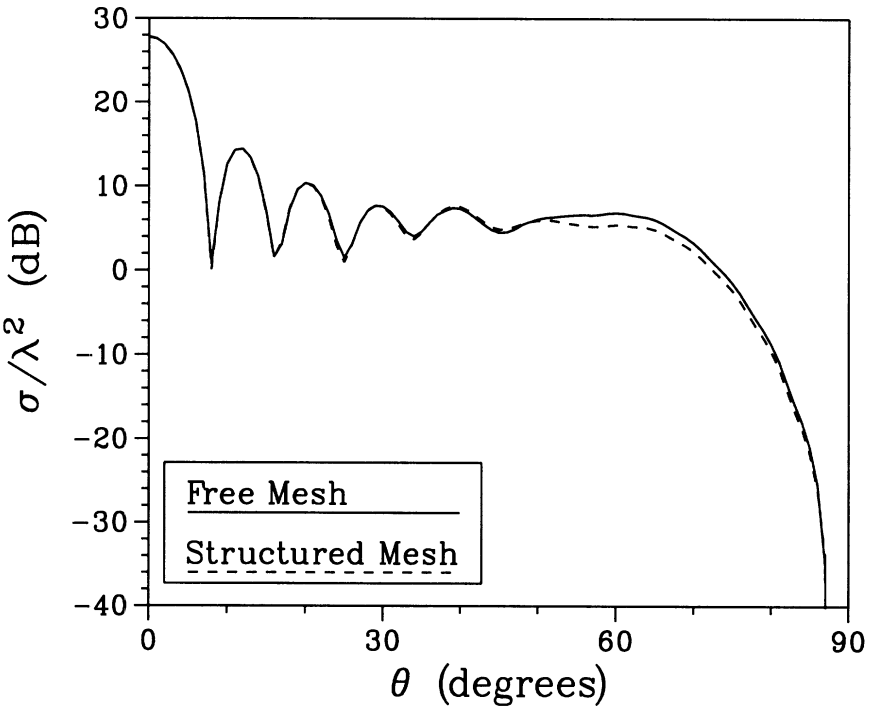


Figure E.3: Structured mesh for a spherical region.

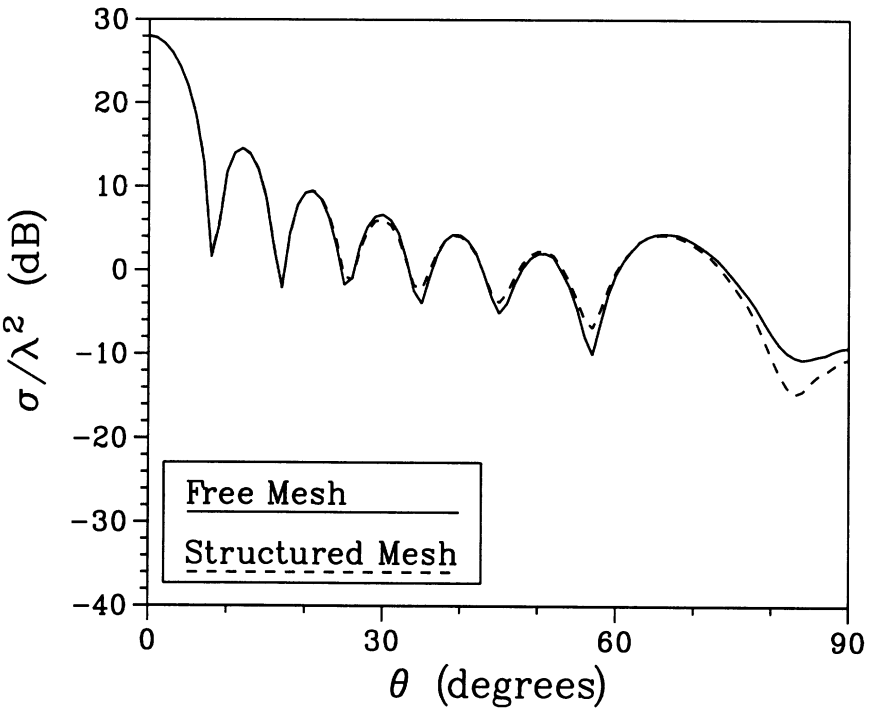
preprocessing, input parameters, and so forth to obtain scattering data of the chosen geometry.

As a validation of this mesh generator, scattering patterns were obtained and compared with the FEMATS benchmark results, which were each based on free meshes generated by I-DEAS. The structured meshes were generated with the same termination dimensions used for the benchmark test cases wherever possible, and an effort was made to match the total number of unknowns (edges) as well. Figure E.4 shows the comparison between the two meshing techniques for the $3.5\lambda \times 2\lambda$ rectangular PEC plate, and excellent agreement is obtained. In Fig. E.5, backscatter patterns in two different cut planes are shown for the $1.75\lambda \times 1\lambda \times 0.125\lambda$ glass plate. The discrepency between the results of the two techniques is primarily due to the homogeneous element size of the structured mesh, compared to the varying element size in the free mesh, which enables the decrease in element size within the glass plate to account for the much shorter wavelength. Thus, for the same dimensions and approximately the same number of total unknowns ($\sim$ 150000), the free mesh models the plate itself with 28584 elements, while the structured mesh would model it with only 5916 elements. The structured mesh used to generate the results in Fig. E.5 had a total of 231666 unknowns and 8160 elements within the glass plate. Another difference between the two models and thus a possible contributor to the discrepencies is that the structured mesh used a conformal box termination, whereas the free mesh model used the mix termination scheme containing rounded edges and corners.

Results for the rectangular and circular inlets are presented in Figs. E.6 and E.7, and conformal mesh terminations were used in both cases. As shown, excellent agreement between the two meshing techniques was obtained for the rectangular inlet in the $\phi = 0$ plane, and the same agreement was observed for a $\phi = 45°$ cut. For the circular inlet, the agreement is not as good in the transition region between the aperture ($\theta = 0$) and side ($\theta = 90°$) normal incidences. The jaggedness of the curves in Fig. E.7 also reveals a limitation to the bi- to monostatic conversion which was used to generate the additional four data points within $\pm 2°$ for each incidence angle. For such scattering geometries, the bi- to monostatic conversion range should be reduced to $\pm 1°$ or possibly not invoked at all over certain aspects of incidence.

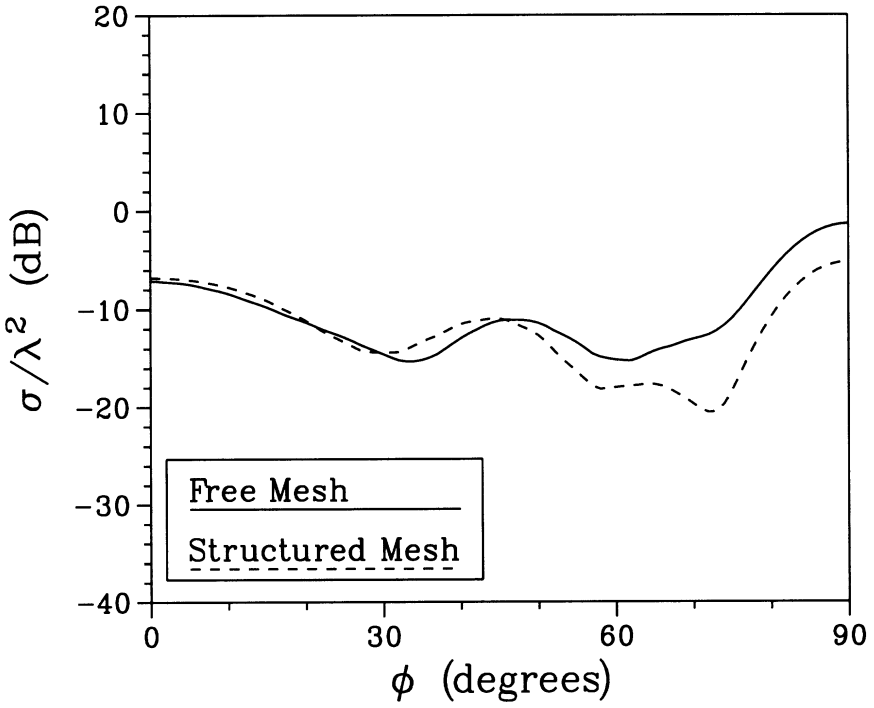


(a)

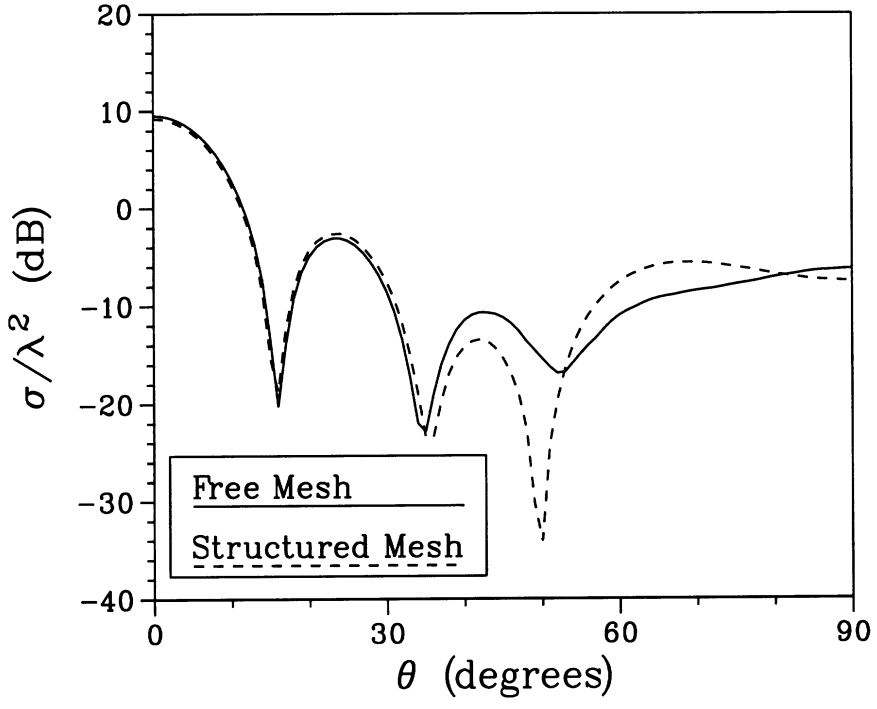


(b)

Figure E.4: Comparison of backscatter patterns using free and structured meshes for the $3.5\lambda \times 2\lambda$ rectangular PEC plate with $\phi = 0$. (a) E^i_θ-polarization, (b) E^i_ϕ-polarization.

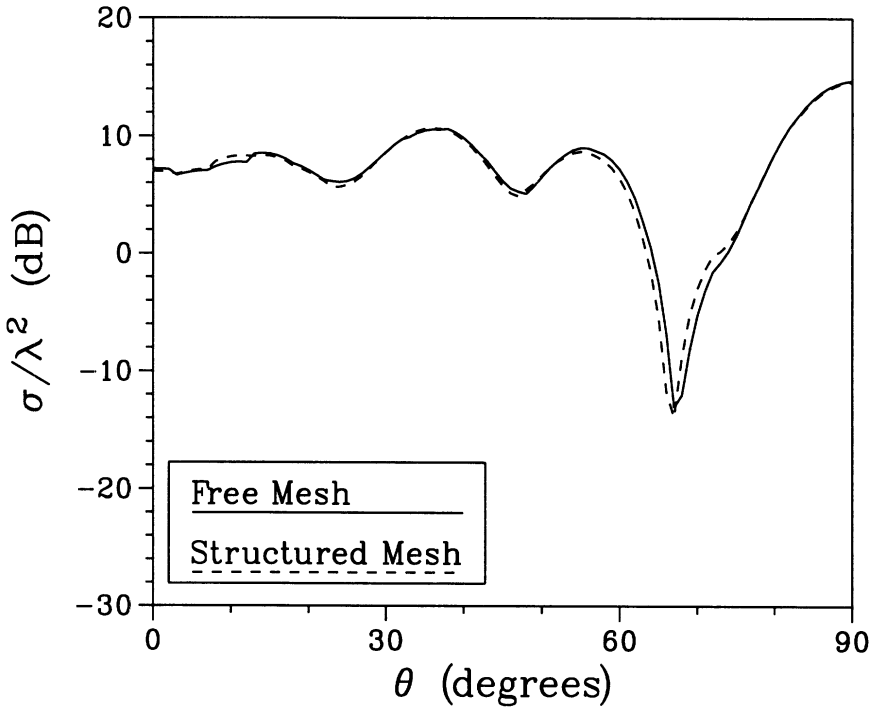


(a)

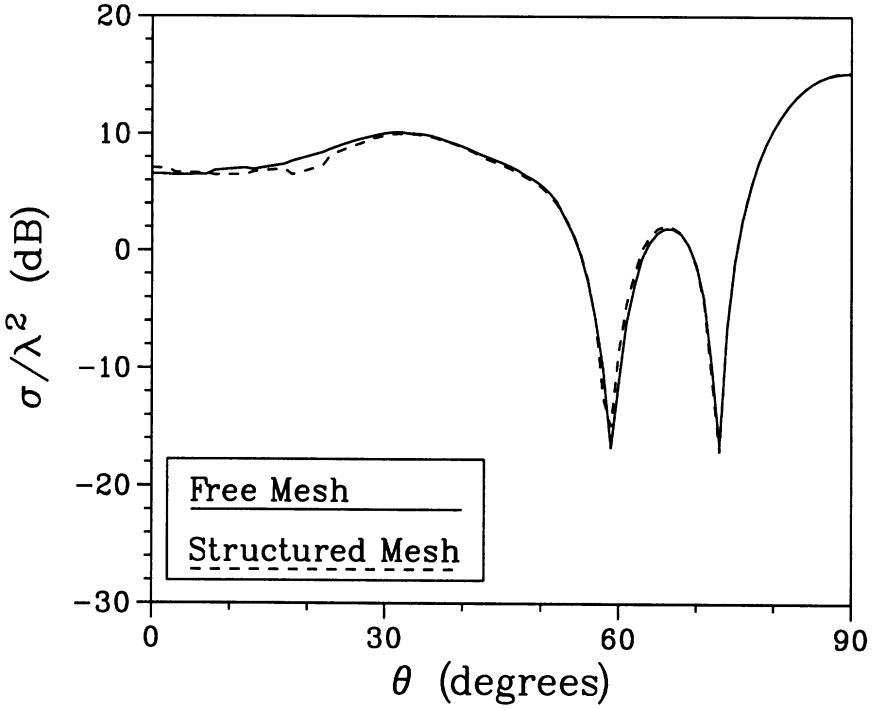


(b)

Figure E.5: Comparison of backscatter patterns using free and structured meshes for the $1.75\lambda \times 1\lambda \times 0.125\lambda$ rectangular glass plate with $\epsilon_r = 3 - j0.09$ for E^i_ϕ-polarization. (a) $\theta = 80°$ cut, (b) $\phi = 0$ cut.

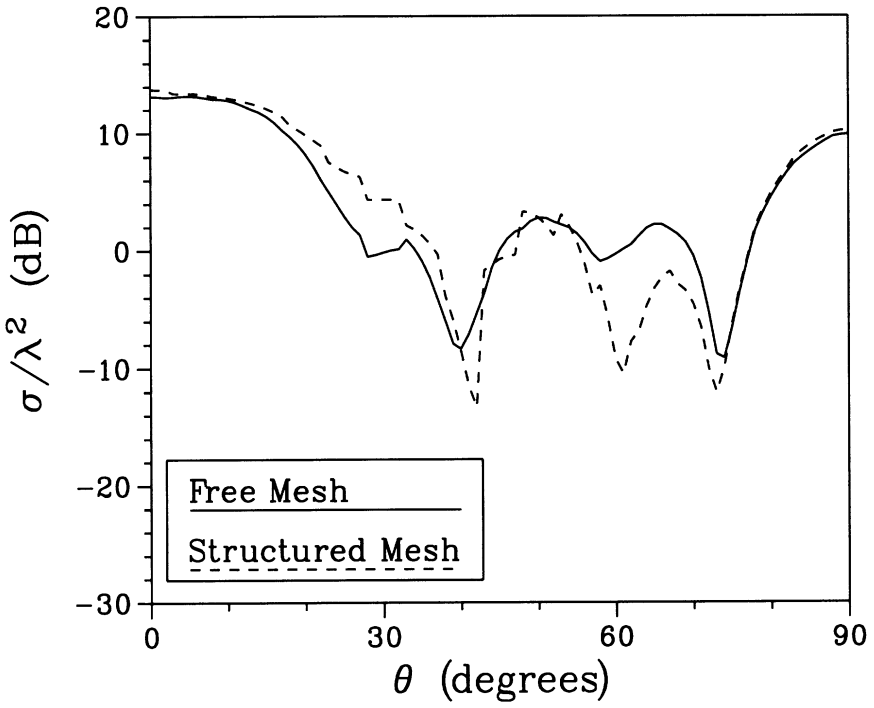


(a)

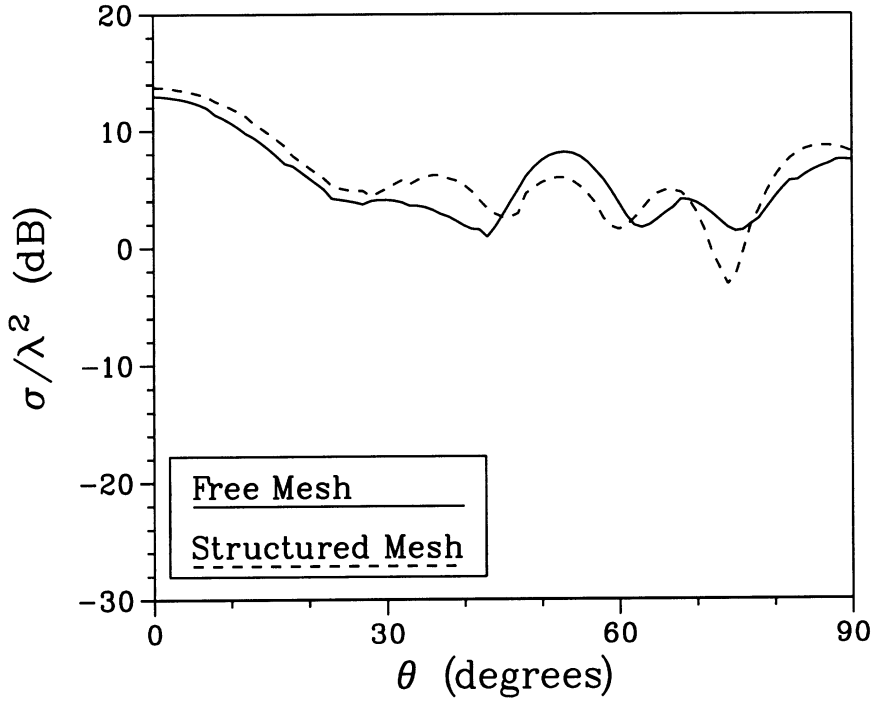


(b)

Figure E.6: Comparison of backscatter patterns using free and structured meshes for the $1\lambda \times 1\lambda \times 1.5\lambda$ rectangular inlet with $\phi = 0$. (a) E^i_θ-polarization, (b) E^i_ϕ-polarization.



(a)



(b)

Figure E.7: Comparison of backscatter patterns using free and structured meshes for the circular inlet with $h = 1.875\lambda$, $dia = 1.25\lambda$ and $\phi = 0$. (a) E^i_θ-polarization, (b) E^i_ϕ-polarization.

E.6 Prismatic Mesh Generator

The primary advantage of employing prismatic meshes is that it greatly simplifies the mesh generation process. Although the tutorial mesh generator described in the previous section uses this technique, its usefulness is limited in that it can only handle a few select geometries. A mesh generator which could handle more arbitrary geometries generated by CAD software such as ACAD was desired. An automatic prismatic mesh generator called PRISM was chosen to generate input files for FEMATS. PRISM was provided by Shishir Pandya of NASA Ames Research Center. PRISM provides several options for mesh generation, hyperbolic explicit, hyperbolic implicit, optimization, and averaged normals. For details of the techniques implemented in PRISM users should contact Shishir Pandya at Ames. In order to make PRISM more user-friendly a Graphical User Interface (GUI) was written. In addition a conversion routine was written to transform an ACAD facet file into a format compatible with PRISM. The output of PRISM is an IDEAS compatible universal file consisting of either prisms or the tetrahedrals needed in the current version of FEMATS.

Figure E.8 shows the outer mesh surface of the NASA benchmark almond grown from an ACAD facet file with PRISM using the "average normals" selection. Figure E.9 shows the mesh with the inner almond surface exposed. At this time the ACAD to PRISM convertor will only handle ACAD facet files consisting of a single entity. As Figure E.8shows the "averaged normals" selection produces a smoothly layered mesh by using the normals of surrounding elements as a guide for element shape and depth. At this time is is the only PRISM selection used for mesh generation.

Figure E.10 shows the PRISM gui interface. Referring to Figure E.10, the user must input the following information:

1. Name of Surface Datafile - This is the input .dat file which is generated by the ACAD to PRISM converter routine.

2. Number of Steps - This is simply the number of layers desired.

3. Number of Shells to Save - This is always one more then the number of steps. A shell is the surface between layers.

4. Initial Step Size - This is simply the desired thickness per layer.

5. Total Marching Distance - This is the total thickness of all layers if Stretch is on. For our applications Stretch is off, so this input is ignored.

6. Stretch - This is a method to vary layer thickness automatically. For our application Stretch is not used at this time.

7. Surface Triangulation Definition - This is the way normals are defined on the 3 sided patches (facets) on the surface of the target in the ACAD facet file. For ACAD facet files Counter-Clockwise corresponds to the Right Hand Normal (RHN) convention defined in ACAD. This means that if you curl your fingers around a facet coincident with the node numbering increment, your thumb points in the direction of the normal. If you look in the ACAD facet file and follow the RHN convention you will find that the normals of the facets points outwards from the almond.

Once all inputs are set, simply click on Generate Prisms. A temporary window will open for user interaction. When PRISM is done this window will prompt the user on whether prisms or tetrahedrals are desired and on whether the user wants the almond surface layer to be saved as a different color. For FEMATS tetrahedrals are necessary.

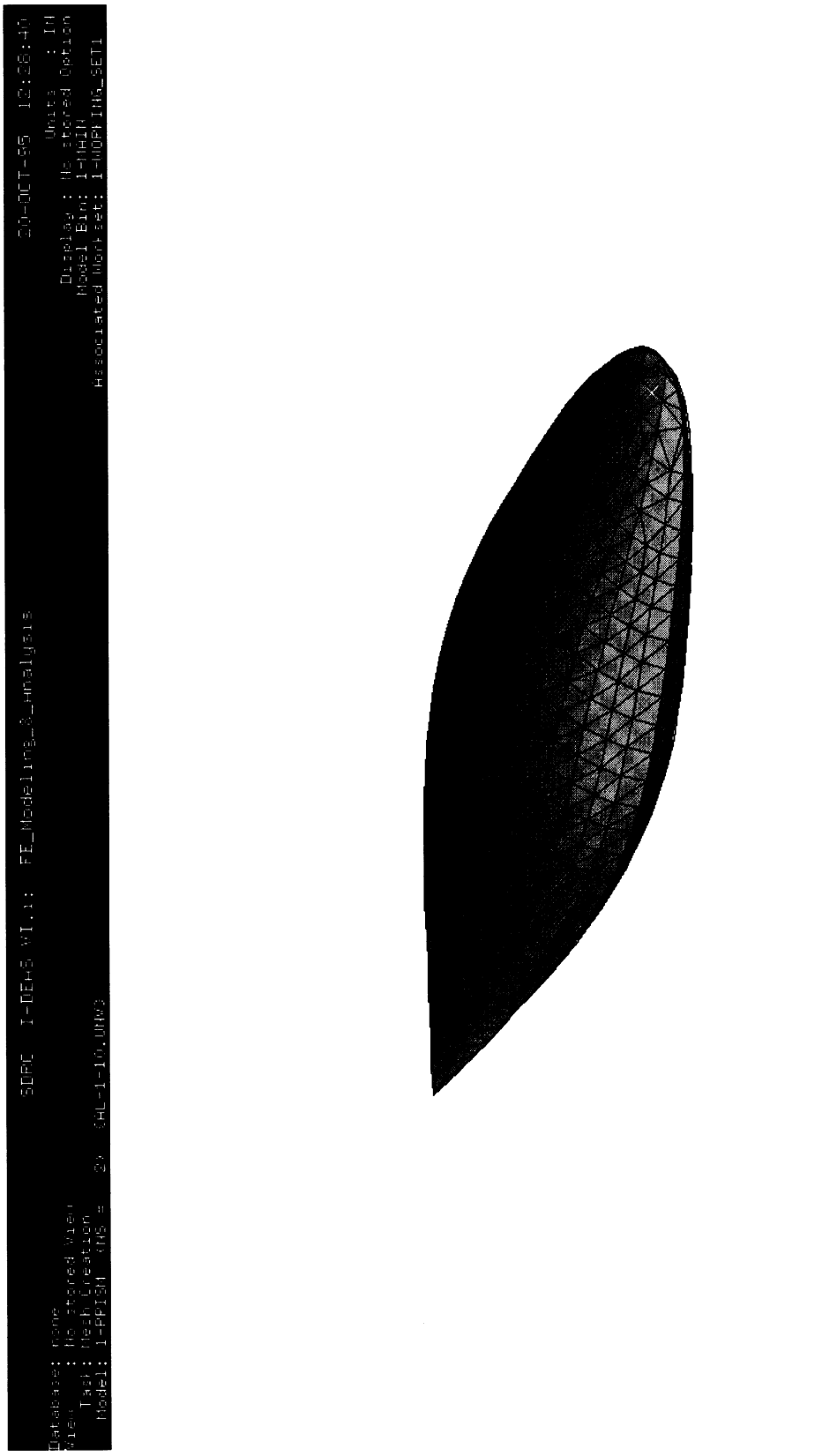


Figure E.8: FEM Mesh - NASA Metallic Almond - Outer Surface

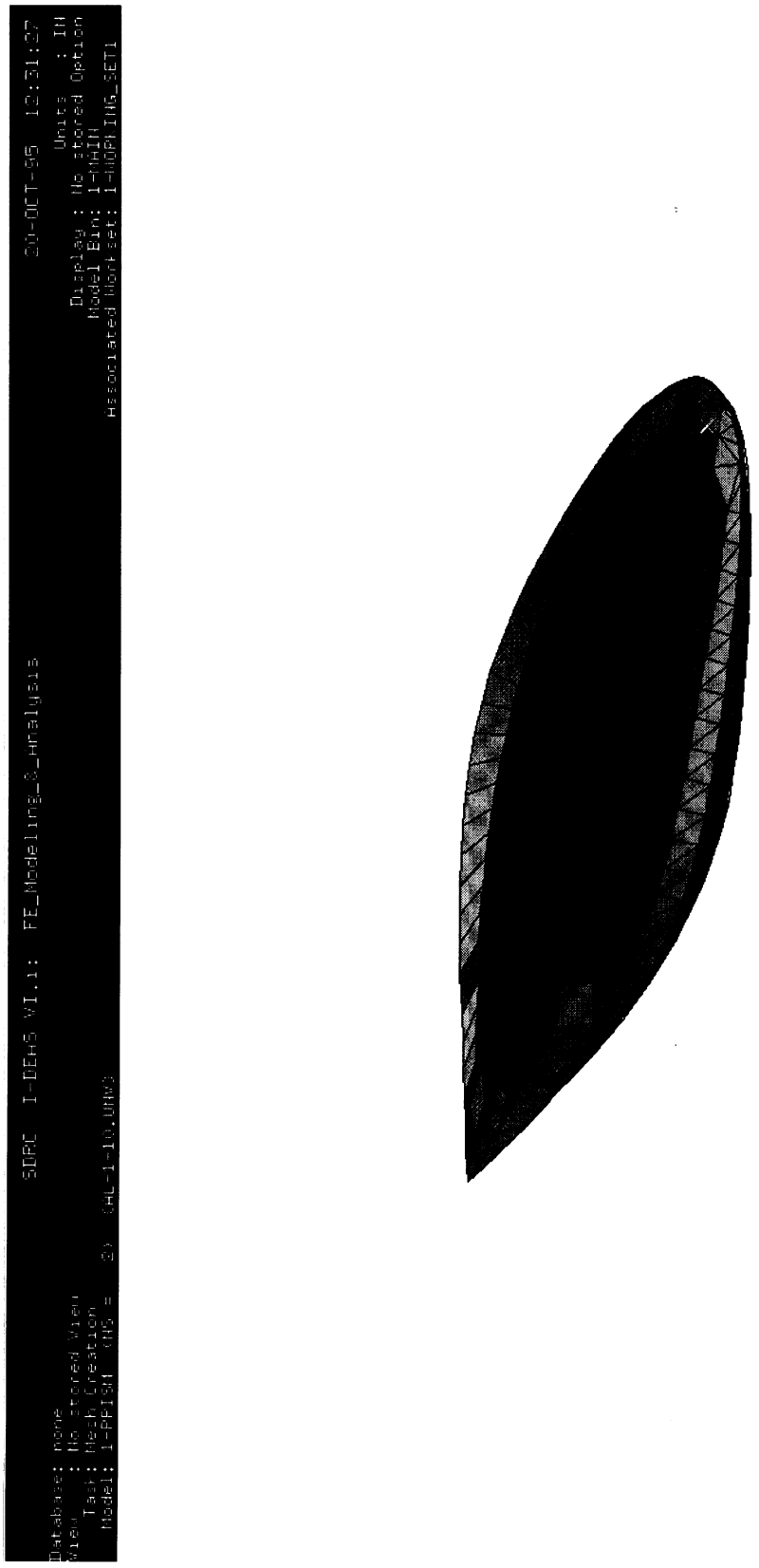


Figure E.9: FEM Mesh - NASA Metallic Almond - Exposed Inner Surface

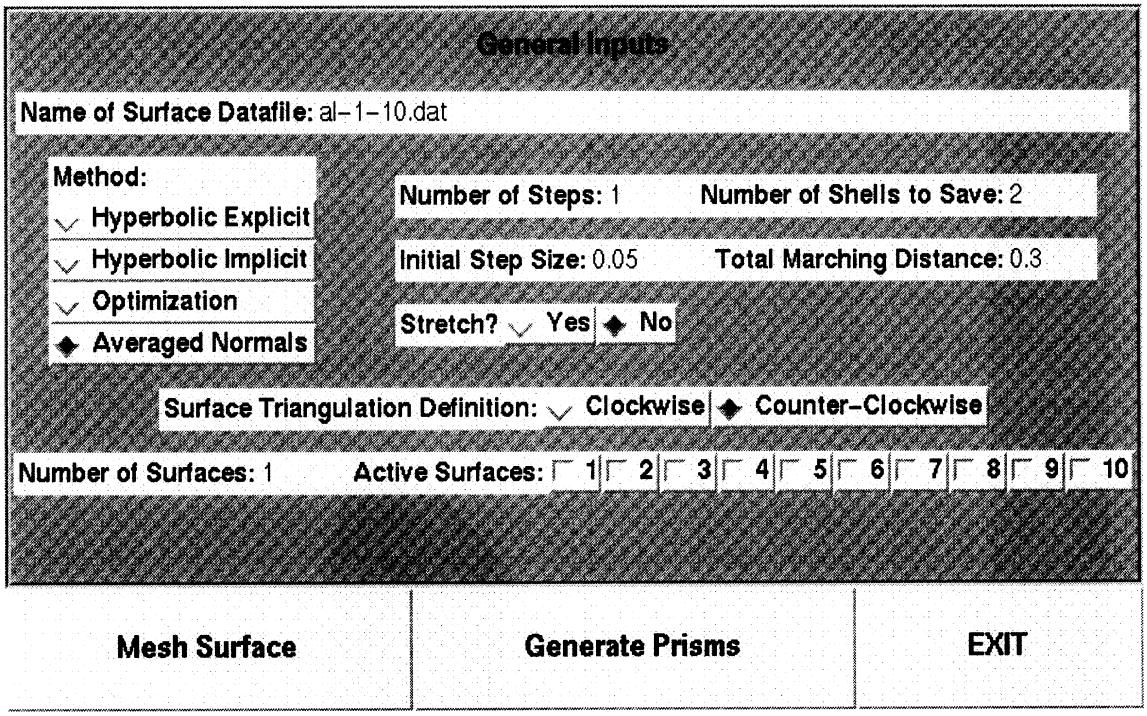


Figure E.10: PRISM GUI

When this step is done IDEAS must now be used to do the final processing on the universal file. THE INNER SURFACE LAYER (TARGET SURFACE) MUST BE DELETED AT THIS STAGE. This layer consists of 3 sided patches and not tetrahedrals. If left in, the FEMATS preprocessor will crash. Note that the inner surface must be deleted, not the inner most group of nodes. Next the user simply uses IDEAS to define nodal groups and elements materials as described previously in the FEMATS manual. The target is now ready for the FEMATS preprocessor.

E.7 FEM Artificial Absorbers (FEM-AA)

The previous version of FEMATS employed a 2nd order Absorbing Boundary Condition (ABC) for mesh termination. This type of termination requires curvature information over the entire target which can be quite cumbersome to implement for all but the simplest of shapes. Because of this, the previous version of FEMATS allowed only 3 mesh termination shapes, spherical, cylindrical, and flat, or a combination of these. A more conformal method of mesh termination is therefore desired to allow for scattering calculations from arbitrarly shaped geometries without having to make major changes in FEMATS. This led to the selection of the FEM-AA mesh truncation scheme. Readers are referred to [1] for the theory behind this method. Using this scheme, the mesh is terminated using a metal backed absorber. The absorber is composed of 3 layers each having the constitutive parameters $\epsilon_r = \mu_r = (1\text{-}j2.7)$. Note that because $\epsilon_r = \mu_r$ the wave impedance of the absorber (at normal incidence) is the same as that of free space, thus, providing minimal reflection at the air/absorber boundary at off normal incidences. To implement the absorber into FEMATS is was only necessary to turn off the incident field on the metal backing the absorber. To do this the absorber was assigned a unique identification number. If the user desires to use the FEM-AA option in FEMATS the following steps must be taken:

1. When grouping nodes in the universal file the outer layer of nodes must be designated conducting (Group Label Prefix C).

2. The elements in the absorber must be given material code "2". Material code "2" is now reserved for artificial absorbers only. As stated in the FEMATs users manual, material number 1 is reserved for air.

3. Do not group nodes in the absorbing layers or on the air/absorber interface as dielectric or any other material group.

4. Do not group any nodes as lying on the outer boundary (Group Prefix A).

5. When queried by the preprocessor about the type of outer boundary used to terminate mesh and associated boundary input (location of center of boundary etc.) simply put in dummy arguments.

6. When inputting material parameters use $\epsilon_r = \mu_r$ = (1-j2.7) for material 2.

If the user desires to make a FEMATS run using ABC's simply run as directed in the previous FEMATS documents and do not assign the material code "2" to any other dielectric.

E.8 Validation – NASA Metallic Almond

The NASA metallic almond shown in Figure E.8 was selected as a further validation of both FEMATS and the FEM-AA mesh truncation scheme. The almond is 9.936 inches long. The target was interrogated at 1.19 GHz where it is 1λ long and is sampled at approximately 1/30 of a wavelength. The mesh consists of 9 layers, each layer 0.05λ long for a total thickness of 0.45λ. The inner 6 layers are air and the outer 3 absorber. The mesh has of 46,878 edges with the outer shell conducting. Figure E.11 shows the 1.19 GHz run from 0 to 180° azimuth for both VV and HH polarization, 0° being the point of the almond with the pattern cut along the narrow cross section of the almond. The FEMATS run is compared with both measured data and FERM (a Method of Moments (MoM) code). As can be seen, FEMATS tracks the measured data quite well. The only significant difference is near 90° aspect for the HH polarization. However the FEMATS data are nevertheless in agreement with the results from the FERM code.

The almond was also interrogated at 3.57 GHz where it is 3λ long and is sampled at approximately 1/10 of a wavelength. The mesh dimensions are as in the previous example. The mesh has 43,578 edges. Figure E.12 shows the 3.57 GHz run from θ = +90° to -90° for HH polarization with ϕ held constant at 0°. -90° corresponds to the point of the almond. FEMATS is compared with an "exact" MoM code, also sampled at 1/10λ, and compares favorably.

Computer Performance

All Almond runs were made on a CRAY Y-MP C90. For the 1λ almond the mesh contained 46,878 unknowns(edges). For VV polarization total CPU time was 464 seconds with an overall flop rate of 315 Mflops. For HH polarization total CPU time was 939 seconds with an overall flop rate of 361.7 Mflops. For the 3λ almond the mesh contained 43,578 unknowns. Total CPU time was 1010 seconds with an overall flop rate of 366.8 Mflops.

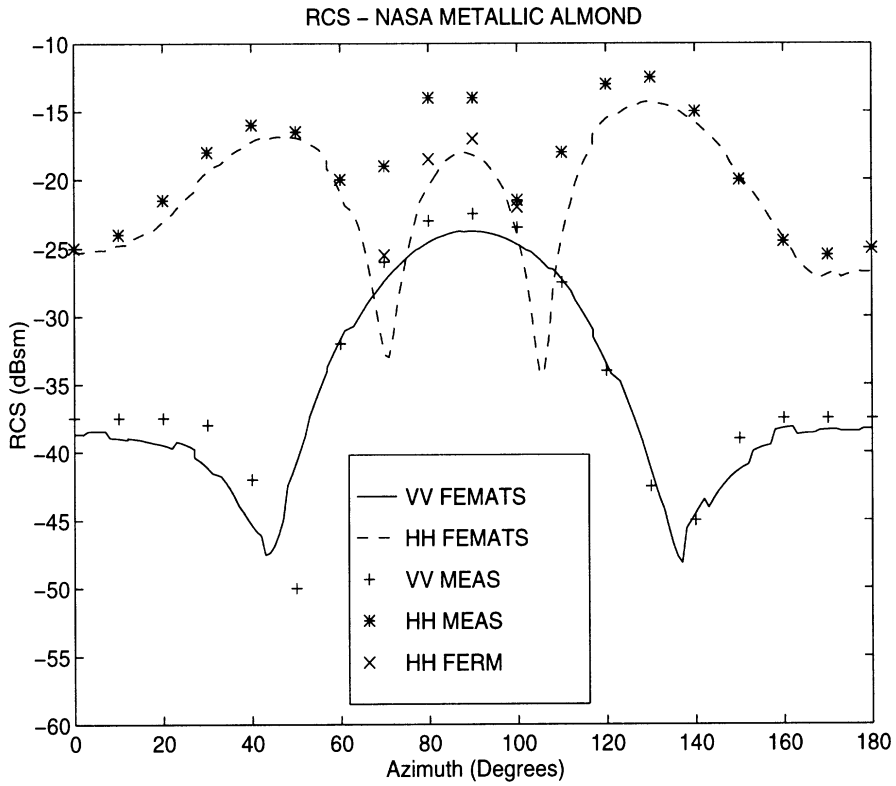


Figure E.11: RCS - NASA METALLIC ALMOND - 1.19 GHz

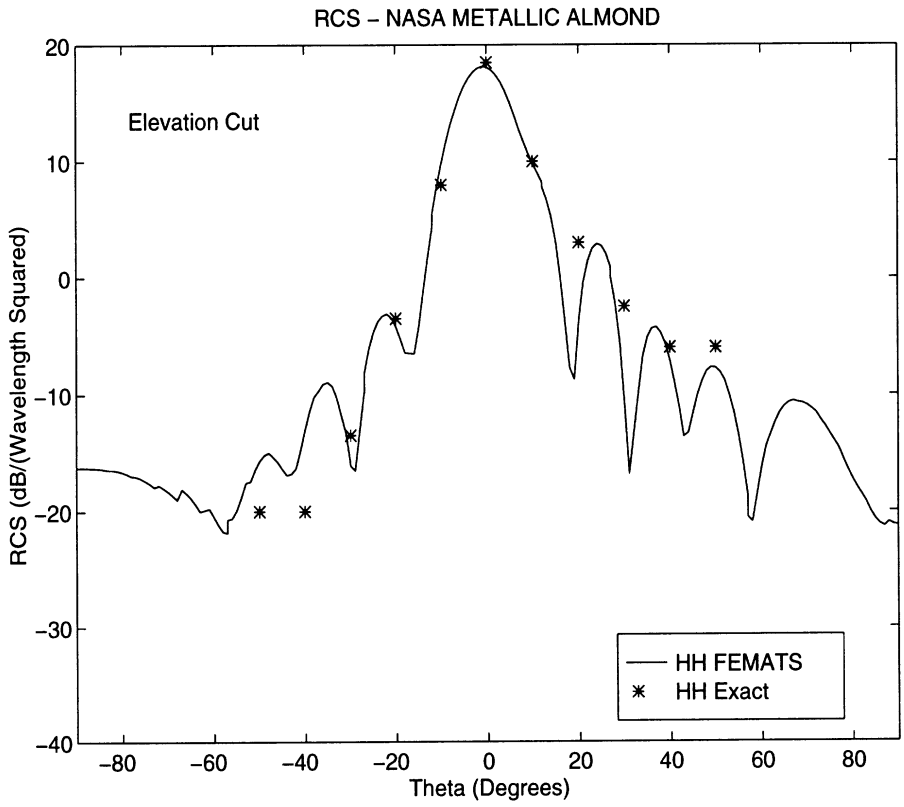


Figure E.12: RCS - NASA METALLIC ALMOND - 3.57 GHz

E.9 Future Work

Planned improvements to FEMATS include:

GUI

A gui interface is in the works and very close to completion. This will be a major improvement in the code from the users point of view.

Further Validation

With the implementation of FEM-AA mesh truncation in FEMATS the validation procedure can now be extended to larger and more complex objects. Planned validation runs to be performed include a coated target such as the coated NASA almond, and a complex object such as the VFY218 benchmark aircraft.

Portability

Plans to extend the portability of FEMATS include porting the code to both the IBM SP2 and CONVEX SPP-1000 parallel machines. The CONVEX machine uses the same HP processor that is in the HP workstations. With minor modifications in the makefile the HP serial version of FEMATS will compile and run on the CONVEX. The CONVEX compiler also has the option of automatic parallelization. While this is by no means the most efficient way to parallelize the code (automatic parallelization can actually slow the code down) it gives the user another platform to run the current serial version on. Due to the large amount of physical memory on the CONVEX the user can run serial problems that would not run on a standard HP workstation. Future plans do however include true parallization of FEMATS for the CONVEX platform.

Anisotropic Absorbers

Implementation of anisotropic absorbers as an optional mesh truncation scheme. While the FEM-AA works quite well a perfect match is achieved at the air/absorber interface for normal incident only. Anisotropic absorbers will be matched at any wave incident angle on the air/absorber interface and should show good results with less layers.

Other future tasks include upgrades of the FEM assembly to make direct use of the prisms, adaptive error control and higher order elements.

References

1. T. Ozdemir and J.L. Volakis, "A comparative study of an absorbing boundary condition and an artificial absorber for truncating finite element meshes." *Radio Science.*,vol. 29, pp. 1255-63, September-October 1994.