

## Book Reviews

this field. There is an extensive bibliography (which essentially stops in 1963).

Graduate students and workers who are acquainted with the elements of group theory and linear algebra will find the book most valuable.

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THE SLOWING DOWN AND THERMALIZATION OF NEUTRONS, by M. M. R. Williams. 582 pages, diagrams, 6 × 9 in. New York, John Wiley & Sons, Inc., 1966. Price, \$19.50.

Those actively engaged in the study of neutron moderation and thermalization problems will find in Williams' treatise an extraordinary collection of data, references, and theoretical analyses. It is unusual to find so much detail in what, because of the limited interest and applicability of the subject, amounts to a monograph; because of this, the book should be of more interest to the active research workers in the field than to the graduate student.

The book is divided into two parts. The first seven chapters comprise the thermalization portion of the title and the last three the slowing down part. As might be expected from such a division the coverage of thermalization problems is considerably better than is the treatment of slowing down. This is quite reasonable, since most of the currently interesting research in this area of physics is in the thermal energy region. The interest in this field is based upon both reactor physics applications and upon the use of thermal neutrons as a tool for solid state physics research. Of these, Williams stresses the former. Only the second chapter of the book is involved with the structure of matter—and that only in an attempt to provide cross sections for the thermal reactor calculations described in the next five chapters. (Chapter 1 gives an interesting historical introduction.)

Both parts of the book are timely with good coverage of recent work. However, so timely and comprehensive a book must be written in a hurry. As a result, much of the material reported is quoted in an uncritical manner. This is a pity, because a physicist of Williams' reputation and background could contribute a great deal of a critical nature. But then

the scope and timeliness of the book would have to suffer.

Chapters 3 to 7 cover neutron thermalization in infinite and finite media, spatial dependence of the spectrum, reactor cell calculations, and synthetic scattering kernels. Of particular interest are the well presented discussions of theoretical work carried out at Brookhaven over the past five years and useful descriptions of some important computer methods. Here, as in the rest of the book, one notes the lack of a good discussion of experimental techniques and applications.

The author describes slowing down kernels and neutron slowing down in infinite and finite media, in the final chapters. Particularly interesting is the description of some modern techniques in the calculation of resonance integrals. However, nothing is available here which is not covered in other texts. The main contribution of the book is the complete and modern coverage of the thermalization field.

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OPTIMAL CONTROL: AN INTRODUCTION TO THE THEORY AND ITS APPLICATIONS, by Michael Athans and Peter L. Falb. 879 pages, diagrams, 6 × 9 in. New York, McGraw-Hill Book Co., 1966. Price, \$19.95.

As one of the first general texts on the theory of optimal control from an engineering point of view, it should be welcomed by teachers struggling to synthesize a one-semester course out of the vast literature and the multitude of possible approaches to the subject. The book will also be sought by a diverse group of experienced engineers and researchers. However, the initial impression one gets from the title of the book that this is a comprehensive text on theory and applications is erroneous.

There is little information given about applications of the theory, there is no discussion of the computation of optimal solutions and other practical considerations, and very few physical examples illustrate and motivate the abstract problems.

Although Chaps. 7 and 8 are entitled "The Design of Time-Optimal Systems" and "The Design of Fuel-Optimal Systems," respec-