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Standards for Engineering Economy notation

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STANDARDS FOR ENGINEERING ECONOMY NOTATION

by

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The Engineering Ecomony Division of the American Society for Engineering Education is preeminent in the United States in publishing papers on engineering economics. In response to a long-felt need, that group has recently adopted a set of recommended standards for the symbols and abbreviations used in engineering economics. Those recommendations are published in The Engineering Economist, Vol. 12, No. 4 (1967).

I should like to propose that authors in the marine industry follow those standards. The accompanying tables summarize the most common concepts and interest relationships. For convenience, the new terms and symbols are paralleled by a column of older forms now found in marine literature. I purposely have omitted reference to several complicated concepts that are of little use in ship economics studies. I have deleted gradient cash flows, continuous compounding, and nonannual periodic compounding. For ship design purposes, we can almost always assume annual compounding and interest rates on a per-year basis. I have also omitted a second, alternative set of forms for indicating the interest factor, interest rate, and number of compounding periods. I did this because the alternative set proposed closely resembles the old forms already familiar to the marine industry.

The new standards use lowercase letters for rates, ratios, and indices. Uppercase letters are used for absolute values, notably time, and sums of money. The form for indicating interest factor, interest rate, and number of periods omits subscripts and superscripts--thus easing the typist's lot and eliminating a fertile source of mistakes.

TABLE I

DEFINITIONS AND SYMBOLS FOR PARAMETERS

Definitions	Symbols Old	Symbols New
Effective interest rate per interest period	i	i
Number of compounding periods	n	N
Present sum of money, or present value (or a single investment)	P	P
Future sum of money	S	F
End-of-period cash flows (or equivalent end-of-period values) in a uniform series continuing for a specified number of periods. The letter A implies annual or annuity.	R	A

TABLE II

SINGLE PAYMENT, COMPOUND AMOUNT RELATIONSHIPS

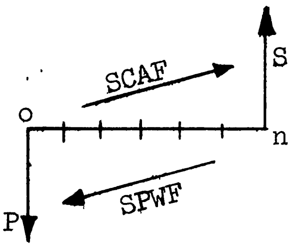
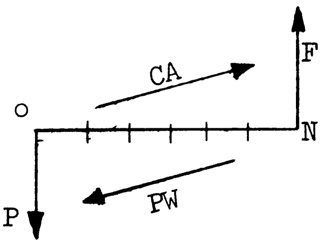
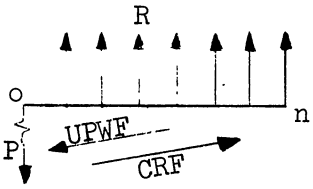
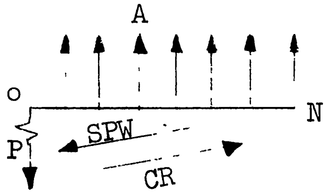
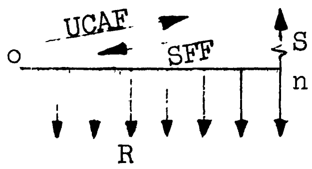
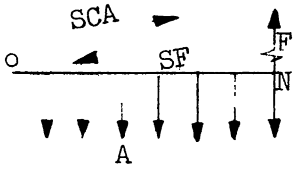
Old Form	New Form
	
$S = [SCAF]_n^i P$	$F = (CA - i\% - N)P$
SCAF = single compound amount factor	CA = compound amount factor (single payment)
$SCAF = (1 + i)^n$	$CA = (1 + i)^N$
$P = [SPWF]_n^i S$	$P = (PW - i\% - N)F$
SPWF = single payment present worth factor	PW = present worth factor (single payment)
$SPWF = \frac{1}{(1 + i)^n}$	$PW = \frac{1}{(1 + i)^N}$
$SCAF = \frac{1}{SPWF}$	$CA = \frac{1}{PW}$

TABLE III

UNIFORM SERIES, COMPOUND AMOUNT RELATIONSHIPS

Old Form	New Form
	
$P = [UPWF]_n^i R$	$P = (SPW - i\% - N)A$
UPWF = uniform present worth factor	SPW = series present worth factor
$UPWF = \frac{(1+i)^n - 1}{i(1+i)^n}$	$SPW = \frac{(1+i)^N - 1}{i(1+i)^N}$
$R = [CRF]_n^i P$	$A = (CR - i\% - N)P$
CRF = capital recovery factor	CR = capital recovery factor
$CRF = \frac{i(1+i)^n}{(1+i)^n - 1}$	$CR = \frac{i(1+i)^N}{(1+i)^N - 1}$
$UPWF = \frac{1}{CRF}$	$SPW = \frac{1}{CR}$





$S = [UCAF]_n^i R$

UCAF = uniform compound amount factor

$$UCAF = \frac{(1 + i)^n - 1}{i}$$

$F = (SCA - i\% - N)A$

SCA = series compound amount factor

$$SCA = \frac{(1 + i)^N - 1}{i}$$

$R = [SFF]_n^i S$

SFF = sinking fund factor

$$SFF = \frac{i}{(1 + i)^n - 1}$$

$A = (SF - i\% - N)F$

SF = sinking fund factor

$$SF = \frac{i}{(1 + i)^N - 1}$$

$$UCAF = \frac{1}{SFF}$$

$$SCA = \frac{1}{SF}$$

DATE DUE

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