

*Updated list*  
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**CLASSIFICATIONS**

**C** COMMERCIAL  
CA INTEREST

**D** INFORMATION HANDLING-DATA PROCESSING  
DH SORTING  
DP PLOTTING  
DZ MISCELLANEOUS

**F** FUNCTIONS-EVALUATION OF-ETC  
FB BESSEL  
FC COMPLEX  
FD POWERS AND EXPONENTIALS  
FE ELLIPTIC INTEGRALS  
FP POLYNOMIALS-INC CHEBYSHEV ETC  
FS SPECIAL  
FT TRIGONOMETRICAL FUNCTIONS  
FZ MISCELLANEOUS

**G** DIFFERENTIAL EQUATIONS  
GA ORDINARY-NOT LINEAR OR 1ST ORDER  
GL LINEAR  
GP PARTIAL

**L** LINEAR ALGEBRA  
LA CHANGE FORM OF MATRIX  
LB BOOLEAN MATRICES  
LE LINEAR EQUATIONS AND INVERSION  
LF FORM SPECIAL MATRIX  
LG ARITHMETIC FUNCTIONS-ONE MATRIX  
LH ARITHMETIC FUNCTIONS-TWO MATRICES  
LL LATENT ROOTS  
LO DETERMINANTS  
LR READ OR INPUT  
LZ MISCELLANEOUS

**M** MATHEMATICAL METHODS  
MC CURVE AND SURFACE FITTING  
MD DIFFERENTIATION-MAX AND MIN  
ME ERROR ANALYSIS  
MG GEOMETRY  
MH HARMONIC ANALYSIS  
MR ROOTS OF EQUATIONS  
MS INTEGRATION AND SUMMATION  
MT INTERPOLATION AND DIFFERENCES  
MZ MISCELLANEOUS

**N** INTEGERS AND NUMBER THEORY  
NC PERMUTATIONS AND COMBINATIONS  
NP PRIME NUMBERS  
NR PARTITIONS  
NZ MISCELLANEOUS

**O** OPERATIONAL RESEARCH  
OL LINEAR PROGRAMMING  
OP PERT-CRITICAL PATH ANALYSIS

**Classifications (cont<sup>d</sup>)**

<b>P</b>	<b>PHYSICS</b>
PH	HEAT
PN	NUCLEAR ENGINEERING
PQ	QUANTUM MECHANICS
<b>S</b>	<b>STATISTICS</b>
SA	ANALYSIS
SB	SMOOTHING
SC	CORRELATION
SM	MOMENTS
SR	REGRESSION
SS	STOCHASTIC PROCESSES
SV	ANALYSIS OF VARIANCE
<b>Z</b>	<b>MISCELLANEOUS</b>
ZA	COMPILER TECHNIQUES
ZM	INPUT AND OUTPUT
ZP	FORMAT
ZZ	MISCELLANEOUS

INDEX of H.U.C.C. AIGOL LIBRARY PROCEDURES.

Procedure Identifier

DH 01	SORT REAL NUMBERS INTO ASCENDING ORDER	shellsort
DH 02	LOCATE ELEMENT IN LIST	search
DH 03	SORT REAL NUMBERS IN ASCENDING ORDER	exsort
DH 04	SORT ROWS OR COLUMNS OF MATRIX	jensort
† DH 05	IPSORT (improved exsort)	ipsort
† DH 06	RIPSORT - Relative Addressing	ripsort
† DH 07	STRINGSORT (for alphabetic order)	sortstrings
† DH 08	PARTSORT	partsort
† DH 09	KEYSORT	keysort
DP 01	OUTPUT GRAPH OF VECTOR ELEMENTS	Graphic
DP 02	OUTPUT PLOT OF ELEMENTS OF TWO VECTORS	Bigraphic
DZ 01	CHARACTER PACK	pack
DZ 02	CHARACTER UNPACK	unpack
DZ03-DZ11	DOUBLE LENGTH ARITHMETIC PACKAGE (W.WARNE) ;	
FB 01	BESSEL FUNCTION FOR SET OF INTEGER ORDERS	BESSEL
FC01-FC26	F.WYNN'S ARSENAL OF COMPLEX ARITHMETIC PROCEDURES :-	
FC 01	COMPLEX ASSIGNMENT	eq
FC 02	MULTIPLE COMPLEX ASSIGNMENT	sepeq
FC 03	COMPLEX MULTIPLICATION	cm
FC 04	COMPLEX DIVISION	cd
FC 05	ASSIMILATE REAL IN COMPLEX OPERATION	real
FC 06	ASSIMILATE IMAGINARY IN COMPLEX OPERATION	imaginary
FC 07	COMPLEX CONJUGATE	exconj
FC 08	MODULUS OF COMPLEX NUMBER	mod
FC 09	ARGUMENT OF COMPLEX NUMBER	arg
FC 10	POLAR FORM	polarform
FC 11	MULTIPLICATION BY IMAGINARY OPERATOR	imult
FC 12	COMPLEX SQUARE	compsq
FC 13	COMPLEX RECIPROCAL	comprecip
FC 14	COMPLEX ROOT	exsqr
FC 15	COMPLEX LOGARITHM	compln
FC 16	COMPLEX EXPONENTIAL	compexp
FC 17	HYPERBOLIC FUNCTIONS	hyp
FC 18	COMPLEX SINE	compsin
FC 19	COMPLEX COSINE	compcos
FC 20	COMPLEX TANGENT	comptan
FC 21	COMPLEX INVERSE SINE	exarcsin
FC 22	COMPLEX INVERSE COSINE	exarccos
FC 23	COMPLEX INVERSE TANGENT	exarctan
FC 24	COMPLEX POWER OF COMPLEX VARIABLE	onehochother
FC 25	TEST FOR EVEN INTEGER	even
FC 26	LOGARITHM OF COMPLEX NUMBER	LOGC
FP 01	SUM SERIES OF CHEBYSHEV POLYNOMIALS	Chebsum
FS 01	LOGARITHM OF FACTORIAL	logfac
GL 01	4TH ORDER RUNGE-KUTTA for differential equations	RKFOUR
LE 01	MATRIX INVERSION	mxinvert
LE 02	SOLVE LINEAR EQUATIONS - ONE R.H. SIDE	SOLVEQ
LE 03	MATRIX DECOMPOSITION A -> L U I	ATOLUI
LE 04	FORWARD AND BACK SOLUTION Ax=b	LUI SOL

LE 05	MATRIX DECOMPOSITION BY CROUT'S METHOD	<i>crout</i>
LE 06	TRIANGULAR MATRIX PRODUCT $LU=A$	<i>LU1TOA</i>
LE 07	INVERT QUASI LOWER TRIANGULAR MATRIX	<i>INVL</i>
LE 08	INVERT QUASI UPPER TRIANGULAR MATRIX	<i>INVU1</i>
LE 09	TRIANGULAR MATRIX PRODUCT $UL=A$	<i>U1LTOA</i>
LE 10	MATRIX DECOMPOSITION $A \rightarrow L1 U$	<i>ATOL1U</i>
LE 11	FORWARD AND BACK SOLUTION $Ax=b$	<i>L1USOL</i>
LE 12	INVERT QUASI LOWER TRIANGULAR MATRIX	<i>INVL1</i>
LE 13	INVERT QUASI UPPER TRIANGULAR MATRIX	<i>INVU</i>
LE 14	TRIANGULAR MATRIX PRODUCT $UL=A$	<i>UL1TOA</i>
LE 15	SOLVE TRIDIAGONAL LINEAR EQUATIONS	<i>tridiag</i>
LE 16	DECOMPOSE SYMMETRIC POSITIVE DEFINITE MATRIX	<i>choleski</i>
LE 17	INVERT LOWER TRIANGULAR MATRIX IN SITU	<i>linv</i>
LE 18	MATRIX MULTIPLICATION	<i>m×mult</i>
LE 19	DECOMPOSE BANDMATRIX INTO LOWER AND UPPER TRIANGLES	<i>bandlr</i>
LE 20	FORWARD AND BACK SOLUTION FOR BAND EQUATION $Ax=b$	<i>bandsol</i>
LE 21	SOLVE BAND EQUATIONS $Ax=b$	<i>bandm×</i>
LE 22	REARRANGE PERMUTED TRIANGULAR MATRIX	<i>MOVEU</i>
LE 23	REARRANGE PERMUTED TRIANGULAR MATRIX	<i>MOVEL</i>
LE 24	DECOMPOSE SYMMETRIC POSITIVE DEFINITE MATRIX	<i>SYMDET</i>
LE 25	FORWARD AND BACK SOLUTION $Ax=b$ , SYMMETRIC A	<i>SYMSOL</i>
LE 26	DECOMPOSE BAND MATRIX WITH PIVOTING	<i>pivlrband</i>
LE 27	FORWARD AND BACK SOLUTION $Ax=b$ , BANDMATRICES	<i>pivsolband</i>
LE 28	DECOMPOSE SYMMETRIC POSITIVE DEFINITE MATRIX	<i>SYMDET</i>
LE 29	FORWARD AND BACKWARD SOLUTION OF $Ax=b$ , SYMMETRIC	<i>SYMSOL</i>
† LE 30	REDUCE MATRIX TO UPPER HESSENBERG FORM	<i>hessenberg</i>
† LE 31	TRIDIAGONALIZE SYMMETRIC MATRIX, GIVENS METHOD	<i>givens</i>
† LE 32	TRIDIAGONALIZE SYMMETRIC MATRIX GIVENS METHOD	<i>rightvec</i>
† LE 33	RIGHTVEC	<i>rightvec</i>
† LE 34	CHEBYSHEV (GOLUB) SOLUTION OF OVERDETERMINED EQNS.	<i>CHEBYSHEV</i>
† LE 35	GOLUB (LEAST SQUARES) SOLN. OF OVERDETERMINED EQNS.	<i>least squar</i>
LL 01	EIGENVALUES AND EIGENVECTORS OF SYMMETRIC MATRIX	<i>jacobi</i>
LL 02	SOLUTION OF THE EIGENPROBLEM $(A-\lambda B)x=0$	<i>eigensolve</i>
LL 03	HOUSEHOLDER TRIDIAGONALIZATION, FULL MATRIX	<i>householder</i>
LL 04	EIGENVALUES OF SYMMETRIC TRIDIAGONAL MATRIX 1	<i>tridibisection1</i>
LL 05	EIGENVALUES OF SYMMETRIC TRIDIAGONAL MATRIX 2	<i>tridibisection2</i>
LL 06	EIGENVECTORS OF TRIDIAGONAL MATRIX	<i>tridinverse</i>
LL 07	EIGENVECTORS OF SYMMETRIC MATRIX	<i>backtransform</i>
LL 08	EIGENVALUES AND VECTORS OF SYMMETRIC MATRIX	<i>vecjacobi</i>
LL 09	HOUSEHOLDER TRIDIAGONALISATION - HALF MATRIX	<i>householder</i>
LL 10	EIGENVALUES OF TRIDIAGONAL MATRIX	<i>eigbisec</i>
LL 11	EIGENVECTORS OF TRIDIAGONAL MATRIX	<i>trivector</i>
LL 12	EIGENVECTORS OF SYMMETRIC MATRIX (UPPER HALF)	<i>eigvectors</i>
† LL 13	EIGENVALUES AND EIGENVECTORS OF NON-SYMMETRIC MATRIX (EBERLEIN)	<i>eigen</i>
† LL 14	VECSYMQREIGEN	<i>vecsymqreigen</i>
† LL 15	BALANCE MATRIX TO REDUCE ITS EUCLIDEAN NORM	<i>balance</i>
† LL 16	SYMQREIGEN	<i>symqreigen</i>
† LL 17	LRQREIGEN - Eigenvalues of non-symmetric matrix	<i>LRQREIGEN</i>
† LL 18	EIGENVALUES AND EIGENVECTORS OF SYMMETRIC MATRIX BY QR2 METHOD (BUSINGER)	<i>symmetric QR2</i>
† LL 19	IMPROVED JACOBI PROCEDURE	<i>epsjacobi</i>
† LV 01	DOT PRODUCT OF TWO VECTORS (DOUBLE LENGTH ARITH.)	<i>dot</i>
LZ 01	GENERATE UNSYMMETRIC TEST MATRICES	<i>testm×</i>

	MC 01	LEAST SQUARES POLYNOMIAL FIT	<i>LSQFIT</i>
	MC 02	LEAST SQUARES LINEAR FIT	<i>Linfit</i>
	MC 03	WEIGHTED LINEAR LEAST SQUARES FIT	<i>wtlinfitt</i>
	MC 04	STANDARD DEVIATION OF FITTED STRAIGHT LINE	<i>Lindev</i>
†	MC 05	CHEBFIT	<i>chebfit</i>
	MD 01	LOCATE MINIMUM OF FUNCTION $f(x)$	<i>MINX</i>
†	MD 02	MINIMUM IN $n$ DIMENSIONS (CONJUGATE GRADIENT)	<i>MINIMUM</i>
†	MD 03	MINIMUM IN $n$ DIMENSIONS (FLETCHER & POWELL)	<i>MINIMUM</i>
†	MD 04	MINIMUM IN $n$ DIMENSIONS (NELDER & MEAD search)	<i>simplex</i>
†	MD 05	LOCATE MINIMUM OF FUNCTION $f(x)$	<i>fmin</i>
†	MD 06	LOCATE MINIMUM OF FUNCTION $f(x)$	<i>Goldsec</i>
	MG 01	CONVERT SEXAGESIMAL ANGLES TO RADIANS	<i>sexrad</i>
	MG 02	CONVERT RADIAN ANGULAR MEASURE TO SEXAGESIMAL UNITS	<i>radtosex</i>
	MG 03	CONVERT CENTESIMAL ANGLES TO RADIANS	<i>centrad</i>
	MG 04	CONVERT RADIAN ANGULAR MEASURE TO CENTESIMAL UNITS	<i>radtocent</i>
	MG 05	COMPUTE DISTANCE AND GRID BEARING	<i>bearing</i>
	MG 06	COMPUTE POLAR CO-ORDINATES OF POINT [X,Y]	<i>polar</i>
	MG 07	COMPUTE POINT OF INTERSECTION FROM ANGLES	<i>intang</i>
	MG 08	COMPUTE POINT OF INTERSECTION FROM BEARINGS	<i>intbrg</i>
	MG 09	THREE POINT RESECTION BY ANGLES	<i>resect</i>
	MG 10	MULTIPLE POINT RESECTION FROM ANGLES	<i>avresect</i>
	MG 11	THREE POINT RESECTION FROM DISTANCES	<i>distresect</i>
	MG 12	MULTIPLE POINT RESECTION USING DISTANCES	<i>avdistresect</i>
	MG 13	THE INACCESSIBLE BASE PROBLEM	<i>farbase</i>
	MG 14	3-DIMENSIONAL COORDINATE GEOMETRY AND VECTOR ARITHMETIC PACKAGE ;	
†	MG 15	FAST CONTOUR	<i>CONTOUR</i>
†	MG 16	CONTOUR (ALGOL)	<i>CONTOUR</i>
	MH 01	COMPUTE FOURIER COEFFICIENTS	<i>fourier</i>
	MH 02	SUM FOURIER SERIES	<i>sumfourier</i>
†	MH 03	COMPLEX FOURIER (COOLEY-TUKEY ALGORITHM)	<i>complex fourier</i>
	MR 01	LOCATE ROOT OF $f(x)=0$ BY CONTINUED BISECTION	<i>bisec</i>
†	MR 02	ROOT	<i>root</i>
	MS 01	GENERAL SUM SERIES	<i>sigma</i>
	MS 02	ADAPTIVE SIMPSON INTEGRATION	<i>simps</i>
	MS 03	EVALUATE DEFINITE INTEGRAL (Havie)	<i>havie</i>
†	MS 04	EVALUATE DEFINITE INTEGRAL (Romberg)	<i>quad</i>
†	MS 05	INTEGRAL with ABSOLUTE tolerance (N.P.L.algorithm)	<i>integral</i>
	MT 01	LAGRANGE INTERPOLATION	<i>Lagrange</i>
	MT 02	AITKEN UNEQUAL INTERVAL INTERPOLATION	<i>Aitken</i>
	MT 03	AITKEN EQUAL INTERVAL INTERPOLATION	<i>equipol</i>
	MT 04	AITKEN Nth ORDER INTERPOLATION	<i>ait</i>
	MT 05	ESTIMATION OF DERIVATIVE - UNEQUAL INTERVALS	<i>dydx</i>
	MT 06	ESTIMATION OF DERIVATIVE - EQUAL INTERVALS	<i>equidydx</i>
	NC 01	REARRANGE ELEMENTS OF VECTOR	<i>PERMB</i>
	NC 02	PERMUTE ROWS OR COLUMNS OF MATRIX	<i>mixmap</i>
	NC 03	PERMUTATION OF ELEMENTS OF A VECTOR	<i>vectorperm</i>
	NC 04	PERMUTE ROWS OR COLUMNS OF MATRIX	<i>mixmap1</i>
	NC 05	PRE OR POST MULTIPLY MATRIX BY PERMUTED IDENTITY MATRIX	<i>perm</i>
	NC 06	INVERSEPERMUTATION OF INTEGER VECTOR	<i>inversepermb</i>
†	NC 07	PERMX	<i>permx</i>
†	NC 08	NEXTPERM	<i>nextperm</i>
†	NC 09	PERMVECTOR	<i>permvector</i>
†	NC 10	VECTORPERM (SLOW)	<i>vectorperm</i>
†	NC 11	VECTORPERM (FAST)	<i>vectorperm</i>

+	OL 01	MINIMUM PATH	<i>minpath</i>
+	OL 02	NETPATHS	<i>netpaths</i>
+	OL 03	SHORTPATH	<i>shortpath</i>
+	OL 04	SIMPLEX LINEAR PROGRAMMING	<i>simplex</i>
	OP 01	CRITICAL PATH SCHEDULING	<i>CRITICALPATH</i>
+	SC 01	SIMPLE CORRELATION COEFF	<i>correlate</i>
	SS 01	REAL RANDOM NUMBER GENERATOR	<i>random</i>
	SS 02	REAL RANDOM NUMBER GENERATOR	<i>rand G2</i>
	SS 03	RANDOM NUMBER GENERATOR - POISSON DISTRIBUTION	<i>poisson</i>
	SS 04	RANDOM NUMBER GENERATOR - NORMAL DISTRIBUTION	<i>normal</i>
	SS 05	LARGE INTEGER RANDOM NUMBERS	<i>bigrn</i>
	SS 06	GENERATE LARGE INTEGER RANDOM NUMBERS	<i>bigrnx</i>
	SS 07	SMALL INTEGER RANDOM NUMBERS	<i>rn</i>
	SS 08	SMALL INTEGER RANDOM NUMBERS	<i>rnx</i>
	ZM 01	OUTPUT BINARY VALUE	<i>binary</i>
	ZM 02	OUTPUT OCTAL VALUE	<i>octal</i>
	ZM 03	SENSE NUMBER GENERATOR KEY	<i>ng</i>
	ZM 04	INPUT NEWLINE STRINGS	<i>charead</i>
	ZM 05	AUTONOMOUS DATA TRANSFER - BINARY PUNCH	<i>out</i>
	ZM 06	AUTONOMOUS DATA TRANSFER - READ BINARY	<i>in</i>
	ZM 07	COPY LEGEND FROM DATA TAPE	<i>copy</i>
	ZM 08	READ ALGOL BUFFER	<i>BUFFER</i>
+	ZM 09	OUTSTRING DATE	<i>date</i>
	ZP 01	PRINT VECTOR	<i>OUTB</i>
	ZP 02	PRINT MATRIX	<i>matprint</i>
	ZP 03	CONTROL FLEXWRITER PAGE PRINTING	<i>pageout</i>

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