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ILLIAC ACTIVE PROGRAM LIBRARY INDEX**

<u>LABEL</u>	<u>SERIAL</u>	<u>DATE</u>	<u>TITLE</u>
A1	63	8/3/60	Floating Decimal Arithmetic Routine (168) (DOI or SADOI)
A3	125	11/27/59	Convert a Number From Floating Decimal Representation to Normal Machine Form (27) (DOI or SADOI)
A4	87	10/28/58	1.7 Precision Floating Decimal (279) (DOI or SADOI)
A5	138	10/13/60	Complex Number Arithmetic (248) (DOI or SADOI)
A6	154	9/24/59	Floating Decimal Routine and Auxiliaries (See Description) (Separate Versions for DOI or SADOI)
A7	244	3/18/59	1.7 Precision Floating Binary Arithmetic and Double Precision Arithmetic With Floating Decimal Conversion (610) (DOI or SADOI)
A8	321	5/17/61	Multiple Precision Integer Subroutine (DOI or SADOI)*
D1	95	7/21/61	Check Point Routine (57+31+s+j(See Text)) (DOI or SADOI)
D4	70	7/21/61	Control Transfer Check (41) (DOI or SADOI)
E2	158	4/27/56	Integration by Simpson's Rule (Tabulated Values) (21) (DOI or SADOI)
E3	186	6/17/60	Integration by Simpson's Rule (Function Values) (38) (DOI or SADOI)
E4	193	8/7/59	Numerical Differentiation with Interpolation (103) (DOI or SADOI)
E5	195	7/20/59	Quadrature by Gauss' Method (18 + 2n) (DOI or SADOI)
F1	114	7/20/61	Solution of a System of Ordinary Differential Equations (41) (SADOI Only)
F2	115	1/23/59	Solution of a System of Differential Equations by Milne's Method (80-46) (SADOI Only)
F3	129	10/7/60	Integration of n Simultaneous 2nd Order Differential Equations with Initial Conditions Specified (Sub. 39-Parameter Storage l=40) (DOI or SADOI)
F5	229	9/22/58	Integration of a System of Ordinary Differential Equations up to a Specified Value of One Variable (60) (SADOI Only)
F6	239	10/7/60	Integration of a System of Ordinary Differential Equations with Automatic Control of Integration Interval (129) (SADOI Only)
* F7	312	8/9/61	Integration of Ordinary Differential Equations with Automatic Control of Integration Interval
FA1	122	12/9/59	Second Order Linear Differential Equation with Two Point Boundary Condition (101) (DOI Only)
FA2	203	7/20/59	Floating Decimal Solution of a System of Ordinary Differential Equations (See Description) (SADOI Only)
G1	78	3/19/59	LaPlace's Equation-Liebmann Method (5 thru 46) (DOI Only)
G2	98	4/10/59	Poisson's Equation-Liebmann-Frankel Method (6 thru 64) (DOI Only)
H1	71	1/23/59	Inverse Interpolation (33) (DOI or SADOI)
H2	72	1/23/59	A Search for the Real Roots of $f(x) = 0$ (80) (DOI or SADOI)

****Number after title is number of words in Routine

* New additions to our library

** Those routines compatible with both DOI or SADOI should have SADOI directives omitted when used with DOI

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<u>LABEL</u>	<u>SERIAL</u>	<u>DATE</u>	<u>TITLE</u>
H3	80	12/16/58	Minimization of a Function of Two Variables (46) (DOI or SADOI)
H4	84	3/31/59	Minimization of a Function of Four Variables (75) (DOI or SADOI)
H5	85	3/5/59	Minimization of a Function of n Variables (89) (DOI or SADOI)
H6	86	7/22/59	Minimization of a Function of n Variables Treating One Variable at a Time (46) (DOI or SADOI)
I1	67	5/20/59	Interpolation (51) (DOI or SADOI)
J2	209	7/20/59	Roots of a Polynomial (Entire Program) (DOI Only)
J3	289	2/15/60	Roots of a Polynomial (85) (SADOI Only)

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<u>LABEL</u>	<u>SERIAL</u>	<u>DATE</u>	<u>TITLE</u>
K3	137	1/27/60	Least Squares (Entire Program) (DOI or SADOI)
K5	182	7/20/61	Autocorrelations (Entire Program) (DOI Only)
K6	185	7/22/59	Chi-Squared (23) (DOI or SADOI)
K8	189	11/27/59	Product Moment Correlations, Variance-Covariances, Means and Standard Deviation for Use with Magnetic Drum (Complete Program) (SADOI Only)
K9	190	9/12/58	Product Moment Correlation, Means, Standard Deviations, Variances in Logarithmic Scale (Entire Program) (DOI Only)
K10	191	9/13/58	Calculate Autocorrection of a Time Series (85) (DOI or SADOI)
K14	233	7/1/60	Multiple Regression Analysis with Transformations (Entire Program) (DOI)
K15	258	3/6/59	Analysis of Variance by Method of Fitting Constants (DOI or SADOI) (Complete)
K16	263	1/13/60	Modified Multiple Regression Analysis (DOI Only)
K17	309	8/25/60	Product Moment Correlations Variance-Covariances, Means and Standard Deviations (Entire Program) (SADOI Only)*
KA2	331	11/17/61	AUTOMATIC POLYNOMIAL APPROXIMATION (SADOI) (COMPLETE PROGRAM)
L3	100	5/20/59	Complete Linear Equation Solver (Complete Program) (DOI or SADOI)
L6	224	5/20/59	Solution of a Set of n Simultaneous Linear Algebraic Equations Using Magnetic Drum Storage (162) (DOI or SADOI)
L7	230	3/25/59	Automatic Linear Equation Solver with Programmed Checks and Calculation of Residues (Entire Program) (DOI or SADOI)
L8	302	7/19/60	Solution of a System of Linear Equations by an Iterative Method (338(20-35 in William's Memory)) (SADOI Only)*
L9	303	7/19/60	Solution of Linear Equations by an Iterative Method (135 + (R1)) = 146 (SADOI Only)*

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<u>LABEL</u>	<u>SERIAL</u>	<u>DATE</u>	<u>TITLE</u>
M4	136	10/13/55	Closed Eigenvalues and Eigenvectors (163) (DOI or SADOI)
M11	160	3/5/59	Matrix Multiplication (Closed) (77) (DOI or SADOI)
M12	173	12/3/58	Triangularization of a Matrix and its Determinant (Complete Program) (DOI Only)
M13	179	5/4/55	Complete Linear Matrix Equation Solver and General Matrix Inversion (Complete Program) (DOI Only)
M14	180	12/3/58	Linear Matrix Equation Solver and General Matrix Inversion (115) (DOI or SADOI)
M15	183	5/19/60	Linear Programming (Complete Program) (DOI or SADOI)
M17	197	11/9/55	Post Multiplication of a Matrix of its Transpose by a Vector (45) (DOI or SADOI)
M18	213	4/3/57	One-Step Automatic Eigenvalue-Eigenvector Program (Entire Program) (DOI)
M19	232	2/13/57	Solution of the Matrix Equation $Ax = \lambda Bx$ where A+B are Symmetric and B is Positive Definite (Entire Program) (DOI or SADOI)
M20	234	1/23/59	Eigenvalues of a Symmetric Matrix by Givens' Method (Entire Program)(SADOI Only)
M21	240	3/6/61	Matrix Multiplication (198) (SADOI Only)
M22	241	5/20/59	Eigenvalues and Eigenvectors of a Symmetric Matrix Using the Methods of Givens and Wilkinson (1054+data storage) (SADOI Only)
M23	246	11/21/58	Closed Eigenvectors and/or Eigenvalues by Jacobi Method (185) (DOI or SADOI)
M24	260	11/3/60	Complete Linear Matrix Equation Solver and General Matrix Inversion Routine Using Drum Storage (DOI Only)
M25	262	4/27/59	Eigenvalues and Eigenvectors of a Symmetric Matrix (SADOI Only)
M26	264	5/6/59	Eigenvalues and Eigenvectors of a Symmetric Matrix (SADOI Only)
M27	267	5/26/59	Linear Matrix Equation Solver and General Matrix Inversion Using Drum Storage (SADOI Only)
M28	270	9/28/59	Matrix Multiplication with or without rescaling (SADOI)
M34	318	3/20/61	Symmetric Matrix Inversion (Entire Program)*
MA1	104	6/4/58	Matrix Multiplication with Floating Decimal Auxiliary (21 or 26-See Description) (DOI or SADOI)

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<u>LABEL</u>	<u>SERIAL</u>	<u>DATE</u>	<u>TITLE</u>
N1	61	4/6/60	Input One Number from Tape, Integer or Fraction (19) (DOI or SADOI)
N2	88	12/14/60	Input a Sequence of Decimal Fractions (26) (DOI or SADOI)
N8	181	4/6/55	Read One Number from Tape as Integer or Fraction (22) (DOI or SADOI)
N12	225	10/29/58	Infraput (39) (DOI or SADOI)
N13	226	3/5/59	Input a Sequence of Fractions, all having the Same Number of Decimal Digits (21) (DOI or SADOI)
N14	227	3/4/59	Input a Sequence of Integers (18) (DOI or SADOI)
N15	271	11/3/59	Mixed Number Input (44)
N16	281	1/20/60	Mixed Number Input (41) (DOI or SADOI)
O2	143	12/19/58	Routine to Plot Point and Axes (29) (SADOI Only)
O3	147	6/4/58	Display Numbers and Letters on the Cathode Ray Tube (13+(See Text)) (DOI or SADOI)
O4	161	9/12/58	Fast Fraction Display 4x6 Raster (68) (DOI or SADOI)
O5	162	3/4/60	Fast Character Display 4x6 Raster (50 words for 0...9,+,-) (SADOI)
O6	177	3/11/54	Punch to Cathode Ray Tube Conversion Program (175+(See Description)) (DOI or SADOI)
O7	245	11/18/58	Linear Interpolation for the Cathode Ray Tube (43) (DOI or SADOI)
P2	52	7/20/59	Print (A) with or without Sign to n Places as Determined by a Program Parameter (18) (DOI or SADOI)
P3	53	4/10/59	Print n Digits of an Integer with or without a Sign (20) (DOI or SADOI)
P4	55	1/23/59	Zero Suppression Integer Print (27) (DOI or SADOI)
P5	37	1/23/59	Print One Number in a Parameter Set Layout (24) (SADOI Only)
P12	194	12/29/59	Single Single Column Print (Revised) (13) (DOI or SADOI)
P13	204	10/10/60	Combined Integer Print (35) (DOI or SADOI)
P15	207	7/20/61	Multiple Precision Integer Conversion (32) (DOI or SADOI)
P16	214	3/9/59	Infraprint (56) (DOI or SADOI)
P17	242	4/22/58	Maximum Speed Fraction Print to Twelve or Fewer Places (59) (DOI or SADOI)
P19	252	1/15/59	Output for the Data Plotter (44) (DOI or SADOI)
R1	116	7/20/59	Square Root Routine (9) (DOI or SADOI)
R2	105	7/21/59	Integral Root $A^{1/p}$ (24) (DOI or SADOI)
R6	320	6/5/61	Fractional Power Routine (18) (DOI or SADOI)*
RA1	92	9/15/58	Floating Decimal Square Root Auxiliary (16) (DOI or SADOI)
RA2	315	1/5/61	Square Root Auxiliary for Routine A7, Floating Decimal Arithmetic Routine (30) (DOI or SADOI)*
S3	130	7/18/60	Logarithm (14) (DOI or SADOI)
S4	212	10/29/58	Exponential (21) (DOI or SADOI)
S5	231	10/29/58	1/32 Natural Logarithm (36) (DOI or SADOI)
SA2	127	6/5/58	Exponential Auxiliary for Floating Decimal (26) (DOI or SADOI)
SA3	155	10/13/60	Natural Logarithm (30) (DOI or SADOI)

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<u>LABEL</u>	<u>SERIAL</u>	<u>DATE</u>	<u>TITLE</u>
T4	140	4/21/61	New Arctan X Routine (25) (DOI or SADOI)
T5	157	4/21/61	Sine Cosine (21) (DOI or SADOI)
T7	293	3/30/60	1/2 Sin X/X (37) (SADOI Only)
TA1	126	6/5/58	Sine Auxiliary for Floating Decimal (26) (DOI or SADOI)
TA2	156	6/5/58	Arctan Auxiliary to the Floating Point Routine (48) (DOI or SADOI)
V1	82	7/21/59	Legendre Polynomials (25) (DOI or SADOI)
V2	120	10/13/60	Tchebyscheff Polynomials (15) (DOI or SADOI)
V4	178	4/4/55	Fourier Analysis (52) (DOI or SADOI)
V9	216	10/29/58	Generate 40-bit Random Numbers (27) (SADOI Only)
X1	218	3/17/59	Decimal Order Input (DOI) (25) (DOI Itself)
X3	222	10/15/56	Constant-Listing Auxiliary (21) (DOI Only)
X12	235	12/3/58	Symbolic Address Decimal Order Input (SADOI) (615) (SADOI Itself)
X16	284	1/12/60	"Current Floating Relativizer" SADOI Modification to be Placed on Program Tape (Special)
XA1	223	7/20/61	Constant Listing Auxiliary for Floating Decimal (18) (DOI Only)
Y1	199	7/29/60	Transfer Blocks of Words from the Memory to the Drum or from the Drum to the Memory (40) (DOI or SADOI)
Y5	291	3/10/60	Transfer Blocks of Words between the Drum and the Williams Memory (35)