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ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue
Argonne, Illinois

APPLIED MATHEMATICS DIVISION
SUMMARY REPORT

July 1, 1959 through June 30, 1960

William F. Miller, Division Director

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PREFACE

The objective of the Applied Mathematics Division is to provide mathematical support for the research and development programs of the Laboratory. This goal is achieved, in particular, by (1) conducting research in applied mathematics, theory and practice of computation, and design of computers and information processing equipment, (2) providing mathematical consultation, and (3) operating a computational service, using both digital and analog machines. The Division is prepared to provide mathematical assistance at any stage of the development of a problem, from its initial formulation to its final solution.

The Consultation and Research Section is available to assist Laboratory personnel in mathematical consultation, problem formulation, selection of appropriate mathematical and numerical techniques, and to carry out analyses of problems. The Applied Programming Section is specifically set up to program digital computing problems for members of other Divisions. The members of this Section generally work from a problem description provided either by the problem originator or jointly by the problem originator and a member of the Consultation and Research Section. In addition, this Section also performs hand computations that arise and provides production services for machine programs.

It is the responsibility of the Programming Development Section to conduct research and development in new programming techniques, to develop needed subroutines and to provide training courses and instruction in programming techniques for the benefit of members of the Division, as well as of other Laboratory personnel. The Digital Operations Group prepares machine input data, schedules machine time and operates the digital machines. The Analog Group is prepared to assist in the formulation, programming and running of problems for the analog computer or to accept the problem and carry out these services entirely within the Group.

APPLIED MATHEMATICS DIVISION

ORGANIZATION CHART
July 1, 1959 thru June 30, 1960

DIVISION OFFICE

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D A Davis, Executive AssistantE J Dreifuerst, Secretary P R Benson, Clerical (R 2/60)
M T Redmond, Secretary (B 2/60) W J Schlenker, Clerical (B 3/60)

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R Chichester (S/59)	M Golomb (S/60)	K Smith (B 10/59)
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H Cohn (S/59)	J Kerec (S/59)	

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T Czaja	C Harrison	
S W Kahler (S/60)	N A Hartley (R 2/60)	
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S B Steidl (R 7/59)	A V Lemmon (S/60)	
	W A Rosenkrantz (S 59/60)	

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C Y Cho (S/59)		S S Janousek (S/60)
J S Dick	<u>D C Jacobson</u> , Gr Ldr	A J Strecok
M E Dittmer	I G Baksys	M Yoshimine (B 6/60)
W G Greenhow	P C Chestnut (S/60)	
J A Gregory (B 8/59)	S G Dean	Clerical
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D F Jordan (B 6/60)	D E Johnson	H M Glen
R T Julke	J A Koerner	J E Gustafson
R N Little (S/59)	S M McLean	S Katilavas
R L Monroe (S/59)	A L Rago	L E Meyer
D L Russell (S/60)	M G Schlapkohl	
M J Sherman (S/60)	*L C Taylor (B 6/60)	

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S C Hanson (B 1/60)	J R Bowers (B 1/60)	R H Wehman (B 6/60)
D Hodges (B 6/60)	W J Dougherty (B 1/60)	M F Whiteman (B 1/60)
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E A Fearnow (B 12/59)	P M Oseland (B 11/59 R 11/59)	J A Stytz (R 2/60)
R H Ivan	C W Putt (S/60)	E A Thieleker (B 6/60)
C J Kilty	V M Richards	P C Tonne (S 59/60)
R L McGrane (R 5/60)	B A Schmidt (B 2/60)	A R Turk
L T Michel	E N Singletary	C J Vallrugo (R 9/59)
J A Nelson		

ANALOG PROBLEM ANALYSIS - PROGRAMMING AND MACHINE OPERATIONS GROUP - N F Morehouse, Gr Ldr

*R A Bare	*G T Hawley (R 3/60)	F J Maletich
L T Bryant	L C Just	W E Scott
		H K Shepard (S/60)

CONSULTANTS

G Birkhoff, Harvard Univ	L D Fosdick, Univ of Ill	N Metropolis, Univ of Chicago
H Cohn, Univ of Arizona	B Friedman, Univ of Calif	J N Snyder, Univ of Ill
R Courant, New York Univ	K O Friedrichs, New York Univ	H S Wulf, Univ of Ill

*Co-op Students

B - Began

S - Summer Employee

R - Resigned

COMPUTER PROGRAMS

The listing which follows contains a summary of each computer program initiated during the report period together with code symbols indicating the extent to which information concerning the program is readily available. In addition, programs previously reported are included if during this reporting period changes were made or additional information concerning them was placed in the program library.

Each summary contains, in order: a job number, program identification number and title, the requestor's name and division affiliation, the consultant's and programmer's names, a brief description of the program and a final line encoded to indicate the machine for which the program was prepared, references applicable to the program, the status of library information concerning the program, and its mathematical classification. This final line uses the abbreviations 704, GEO, and ANA to refer to the computer (IBM 704, GEORGE, or PACE Analog, respectively) for which the program was developed. The file codes: A, P, S, B, G, and O are used to indicate the library information available and are interpreted as follows:

- A - mathematical analysis effort,
- P - programming effort,
- S - symbolic or source or program listing,
- B - binary or source deck or tape,
- G - GEORGE tape, and
- O - operating instructions.

Following the file code symbols the AMD program library classification code, if any, appears. The classification codes used currently are:

C. Polynomials and Special Functions

1. Evaluation of Polynomials
2. Roots of Polynomials
3. Evaluation of Special Functions
4. Simultaneous Non-linear Algebraic Equations
5. Simultaneous Transcendental Equations

D. Operations on Functions and Solutions of Differential Equations

1. Numerical Integration
2. Numerical Solutions of Ordinary Differential Equations
3. Numerical Solutions of Partial Differential Equations
4. Numerical Differentiation

E. Interpolation and Approximations

1. Table Look-up and Interpolation
2. Curve Fitting
3. Smoothing

F. Operations on Matrices, Vectors and Simultaneous Linear Equations

1. Matrix Operations
2. Eigenvalues and Eigenvectors
3. Determinants
4. Simultaneous Linear Equations

G. Statistical Analysis and Probability

1. Data Reduction: Is interpreted as the calculation of the more common statistical parameters such as mean, median, standard deviation, etc.
2. Correlation and Regression Analysis:
Includes curve fitting which is explicitly for statistical purposes.
3. Sequential Analysis
4. Analysis of Variance
5. Random Number Generators
6. Monte Carlo Problems

H. Operations Research and Linear Programming

M. Information Processing

1. Sorting
2. Report Preparation

R. Geometry

S. Machine Design

- Z. All Others: Contains all programs for which no primary class has been selected. Programs which seem to be included in a primary class but which are not adequately described by a sub-class are assigned the sub-class designation of zero within the applicable primary classification.

264 PHY40 IBM 650 COMPUTATION

REQUESTOR J. SCHIFFER PHYSICS

CONSULTANT W. MILLER PROGRAMMER L. KASSEL

650 REFERENCES FILE CODES D1

484 RE133 SOFOCATE (WAPD)

REQUESTOR M. BUTLER APPLIED MATHEMATICS

PROGRAMMER J. KOERNER

A WESTINGHOUSE PROGRAM WHICH CALCULATES THERMAL CONSTANTS AVERAGED OVER A WIGNER-WILKINS FLUX SPECTRUM.

704 REFERENCES WAPD-TM-39 FILE CODES O D2

528 CHM107 LEAST SQUARES DETERMINATION OF PARAMETERS IN VAPOR PRESSURE FORMULA

REQUESTOR E. WEAVER CHEMISTRY

PROGRAMMER R. LITTLE

THIS PROGRAM DETERMINES THE PARAMETERS IN THE VAPOR PRESSURE FORMULA BY THE METHOD OF LEAST SQUARES FOR ANALYSIS OF VAPOR PRESSURES OF THE METAL HEXAFLUORIDES.

704 REFERENCES GL DPA1, NO SMQA FILE CODES APSB O E2

573 PHY130 GAMMA RAY SPECTRAL ANALYSIS

REQUESTOR B. HAMERMESH PHYSICS

PROGRAMMER B. GARBOW

THIS PROGRAM ANALYZES ENERGY LEVELS OF A GAMMA RAY SPECTRUM INTO A DECAY SCHEME BY FORMING LEVELS FOR COMMON DIFFERENCES AND COMPARING THE RESULTING CALCULATED TRANSITION ENERGIES WITH MEASURED ENERGIES.

704 REFERENCES FILE CODES PSB O Z0

613 PHY140 TRIPLE ANGULAR CORRELATIONS

REQUESTOR J. SCHIFFER PHYSICS

PROGRAMMER J. DENES

THIS PROGRAM COMPUTES CERTAIN CORRELATIONS IN STUDYING ANGULAR SYMMETRIES.

704 REFERENCES

FILE CODES APS C3

616 AMD115 NUMERICAL SOLUTION OF THE SCHRODINGER EQUATION FOR CENTRAL FIELDS

REQUESTOR W. MILLER APPLIED MATHEMATICS

CONSULTANT W. CODY PROGRAMMER K. HILLSTROM

A GEORGE VERSION OF AN ILLIAC ROUTINE TO HANDLE SCHRODINGER PROBLEMS FOR ANY SPHERICALLY SYMMETRIC POTENTIAL. THE PROGRAM CAN FIND EIGENVALUES, VALUES OF THE WAVE FUNCTION AT REGULARLY-SPACED INTERVALS, EVALUATE MATRIX ELEMENTS (TRANSITION PROBABILITIES), AND SOLVE SELF-CONSISTENT FIELD PROBLEMS.

GEO REFERENCES ILLIAC,F4-198

FILE CODES AB GO D2

650 PHY148 NUMERICAL SOLUTION OF A CLASS OF INTEGRAL EQUATIONS OF THE FIRST KIND

REQUESTOR R. LANE PHYSICS

CONSULTANT D. PHILLIPS PROGRAMMER M. FISHERKELLER

THE INTEGRAL EQUATION $G(L) = \int_{-A}^A (F(X)K(X-L))DX$ IS SOLVED FOR $F(X)$ GIVEN THE FUNCTIONS G AND K . IN ADDITION GRAPHS ARE PLOTTED OF G , F , AND K .

704 REFERENCES

FILE CODES P B O Z0,D1,4

670 CHM116 DIFFUSION KINETICS III (2 RADICALS, 2 SOLUTES)

REQUESTOR H. FRICKE CHEMISTRY

CONSULTANT E. BAREISS PROGRAMMER C. CHAMOT

SOLUTION OF A SYSTEM OF FOUR NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS OF PARABOLIC TYPE, INTEGRATION OF REACTION PRODUCTS OVER ENTIRE SPACE AND TIME, DETERMINATION OF DIFFUSION AND REACTION PARAMETERS BY MULTIDIMENSIONAL INTERPOLATION.

704 REFERENCES 234/CHM8

FILE CODES A SB O D3

687 CEN102 URANIUM OXIDATION KINETICS

REQUESTOR L. LIEBOWITZ CHEMICAL ENGINEERING

CONSULTANT E. BAREISS PROGRAMMER A. BATES

KINETICS PARAMETERS AND CALIBRATION COEFFICIENTS ARE DETERMINED BY LEAST SQUARES FIT, HYPOTHESIS TESTING.

704 REFERENCES

FILE CODES APSB O E2,E3

712 AMD120 ELASTIC AND INELASTIC SCATTERING OF ELECTRONS AND POSITRONS BY ATOMIC HYDROGEN

REQUESTOR W. MILLER APPLIED MATHEMATICS

PROGRAMMER K. SMITH

1. MATRIX TYPE PROBLEM TO CALCULATE CROSS SECTIONS FROM N COUPLED EQUATIONS, WHERE N IS LESS THAN OR EQUAL TO THREE.

2. NUMERICAL SOLUTION OF N SECOND ORDER COUPLED DIFFERENTIAL EQUATIONS.

3. NUMERICAL SOLUTION OF N SECOND ORDER COUPLED INTEGRO-DIFFERENTIAL EQUATIONS.

704 REFERENCES ANL6095

FILE CODES O D2,F1

725 CEN METAL-WATER CHEMICAL REACTIONS

REQUESTORS H. BATES,R. LIIMATAINEN CHEMICAL ENGINEERING

CONSULTANT F. MOREHOUSE PROGRAMMER L. JUST

THE THEORETICAL STUDIES OF METAL-WATER REACTORS BEGUN WITH THE CHEMICAL ENGINEERING DIVISION IN THE SPRING OF 1959 CONTINUED WITH THE SOLUTION OF A MULTIREGION MODEL. PROFESSOR BATES OF THE UNIVERSITY OF KANSAS PARTICIPATED IN THE WORK DURING THE SUMMER.

ANA REFERENCES

FILE CODES

727 MET124 CRYSTAL LATTICE PARAMETER DETERMINATION

REQUESTOR M. MUELLER METALLURGY

PROGRAMMER W. GREENHOW

THIS IS THE 704 FORTRAN VERSION OF 544/MET109.

704 REFERENCES

FILE CODES

E2

729 IINSE PROBLEM SOLUTION ON THE ELECTRONIC ANALOG COMPUTER

REQUESTOR J. BAIRD INTERNATIONAL INSTITUTE

CONSULTANT F. MOREHOUSE PROGRAMMER L. BRYANT

A COURSE WAS AGAIN GIVEN AS PART OF THE IINSE CURRICULUM. THE COURSE CONSISTS OF SEVERAL EXPERIMENTS DESIGNED TO ILLUSTRATE THE USE OF ANALOG COMPUTERS FOR REACTOR COMPUTATIONS.

ANA REFERENCES

FILE CODES

730 IINSE REACTOR ANALOG HANDBOOK COMPUTATION

REQUESTOR G. PAWLICKI INTERNATIONAL INSTITUTE

CONSULTANTS D. HANG, E. MANNING PROGRAMMER L. BRYANT

PROFESSORS HANG AND MANNING OF THE UNIVERSITY OF ILLINOIS, AND NORTH CAROLINA STATE COLLEGE, RESPECTIVELY, COMPARED ANALOG COMPUTER SOLUTIONS OF THE REACTOR KINETICS EQUATIONS WITH DATA OBTAINED FROM THE ARGONAUT REACTOR AS PART OF THE SUMMER INSTITUTE PROGRAM.

ANA REFERENCES

FILE CODES

735 PHY165 PULSE HEIGHT SORTING

REQUESTOR G. PERLOW PHYSICS

CONSULTANT J. COOK PROGRAMMER H. TURNER

PULSE HEIGHTS FROM A NEUTRON SPECTROMETER ARE CONVERTED INTO OSCILLATION CYCLES WHICH ARE PUNCHED ON TAPE. THE PROGRAM CONVERTS BACK INTO PULSE HEIGHTS AND FORMS A HISTOGRAM.

GEO REFERENCES

FILE CODES

C1

742 RE FUEL BURNOUT

REQUESTOR H. ISKENDERIAN REACTOR ENGINEERING

PROGRAMMER L. BRYANT

ANA REFERENCES

FILE CODES

744 RE186

REQUESTOR W. LOEWENSTEIN

REACTOR ENGINEERING

PROGRAMMER D. JOHNSON

THIS PROGRAM COMPUTES SUMS OVER SELECTED CONSECUTIVE ENERGY GROUPS OF FLUX-WEIGHTED CROSS SECTIONS OR RECIPROCAL CROSS SECTIONS.

704 REFERENCES

FILE CODES

Z0

749 CEN104 LEAST SQUARES FIT OF HIGH TEMPERATURE ELECTROMOTIVE
FORCE DATA

REQUESTOR I. JOHNSON

CHEMICAL ENGINEERING

PROGRAMMER M. DITTMER

ONE OR MORE OF THREE POSSIBLE FITS IS DETERMINED FOR EACH SET OF DATA. RESIDUALS AND STANDARD DEVIATION OF EACH FIT ARE COMPUTED.

704 REFERENCES

FILE CODES APSB 0 E2

GEO REFERENCES

FILE CODES APSBG0 E2

750 CHM119 A CRYSTALLOGRAPHIC LEAST SQUARES REFINEMENT PROGRAM

REQUESTOR S. SIEGEL

CHEMISTRY

CONSULTANT W. CODY

PROGRAMMER N. PURCELL

THIS OAK RIDGE PROGRAM CALCULATES STRUCTURE FACTORS AND DOES A LEAST SQUARES REFINEMENT OF CRYSTAL STRUCTURES USING X-RAY OR NEUTRON DIFFRACTION DATA.

704 REFERENCES ORNL59-4-37

FILE CODES P B 0 E2

751 CHM120 $\rho(x,y,z)$ AS A FOURIER SUM

REQUESTOR S. SIEGEL

CHEMISTRY

PROGRAMMER N. PURCELL

704 REFERENCES

FILE CODES PSB 0 Z0

756 CHM121 FRINGING MAGNETIC FIELDS AND SOME EFFECTS ON ION
TRAJECTORIES

REQUESTOR A. JAFFEY

CONSULTANT J. COOK

PROGRAMMERS M. FISHERKELLER
A. BATES

THIS PROGRAM IS IN TWO PARTS. PART 1 EVALUATES THE VARIATION OF
THE X- AND Y-COMPONENTS OF THE FRINGING MAGNETIC FIELD AS A FUNCTION
OF THE DISTANCE FROM THE INTERIOR UNIFORM FIELD AND THE MEDIAN PLANE.
PART 2 EVALUATES THE BENDING EFFECT OF THE FIELD ON TRAJECTORIES
ENTERING IN A DIRECTION PARALLEL TO THE MEDIAN PLANE, AS A FUNCTION
OF THE ANGLE OF THE ENTRANCE TRAJECTORY.

704 REFERENCES

FILE CODES APSB O D2

757 PHY168 SOLUTION OF NON-LINEAR EQUATIONS BY THE NEWTON-
RAPHSON METHOD

REQUESTOR R. LAWSON

PHYSICS

PROGRAMMER C. CHO

THREE NON-LINEAR EQUATIONS ARE SOLVED BY THE NEWTON-RAPHSON
METHOD.

GEO REFERENCES

FILE CODES

C4

758 RE189 DETERMINATION OF ALPHA AS A FUNCTION OF THETA(X) FOR
A GIVEN THETA(L)

REQUESTOR Y. CHANG

REACTOR ENGINEERING

PROGRAMMER A. RAGO

SOLUTION OF A TRANSCENDENTAL EQUATION FOR ALPHA WITH A RANGE OF
VALUES OF THE PARAMETERS INVOLVED.

704 REFERENCES

FILE CODES PSB O C3

760 RPY115 RADON REGRESSION STUDY

REQUESTOR H. MOSES

RADIOLOGICAL PHYSICS

PROGRAMMER W. GREENHOW

THIS PROGRAM IS IN TWO PARTS. PART 1 IS THE COMPUTATION OF 8 HOUR, DAILY, AND MONTHLY AVERAGES OF RADON STUDY DATA AND LISTING OF THESE DATA. PART 2 IS A REGRESSION STUDY OF SELECTED VARIABLES.

704 REFERENCES

FILE CODES

G2

763 EL106 SODIUM IODIDE INDEX OF REFRACTION

REQUESTORS W. MANAGAN, S. BAKER

ELECTRONICS

PROGRAMMER M. FISHERKELLER

SOLUTION OF SIMULTANEOUS EQUATIONS TO DETERMINE RESONANCE CONSTANTS FOR SODIUM IODIDE.

GEO REFERENCES

FILE CODES

F4

765 RE191 DC AND RF PERTURBED PRESSURE FUNCTION

REQUESTOR J. BUTLER

REACTOR ENGINEERING

PROGRAMMER M. BUTLER

A SET OF TWO PROGRAMS, ONE OF WHICH COMPUTES THE PERTURBED PRESSURE FUNCTION FOR THE DC FIELD, THE OTHER COMPUTES THIS SAME FUNCTION FOR THE RF FIELD.

704 REFERENCES

FILE CODES

Z0

767 PHY171 FLUCTUATIONS IN THE RADIATION WIDTH PRODUCED BY A PORTER-THOMAS DISTRIBUTION OF THE PARTIAL WIDTHS.

REQUESTOR R. CARPENTER

PHYSICS

PROGRAMMER A. BATES

THIS PROGRAM CALCULATES A SUM OF A LARGE NUMBER OF TERMS, EACH A PRODUCT OF A FACTOR, $\text{GAMMA}(N)$, CALCULATED FROM A SPECIFIED FORMULA, AND A FACTOR CHOSEN AT RANDOM FROM A GIVEN PROBABILITY DISTRIBUTION.

GEO REFERENCES

FILE CODES APS G0 C1,G6

768 HEP101 EDDY-CURRENTS IN HOMOPOLAR GENERATOR FOR PULSE OUTPUT

REQUESTOR E. MUSSET

HIGH ENERGY PHYSICS

CONSULTANT E. KEBERLE

PROGRAMMER W. SNOW

TIME CONSTANTS OF MAGNETIC FLUX BUILD-UP AND JOULE-LOSSES BOTH DUE TO EDDY-CURRENTS CAUSED BY TRAPEZOIDAL COIL-INPUT (AMPERE TURNS) IN UNI-POLAR GENERATOR ARE CALCULATED FOR DIVERSE PHYSICAL AND GEOMETRIC PARAMETERS (SUSCEPTIBILITY, CONDUCTIVITY, AIR-GAPS, ROTOR DIMENSIONAL ETC.). PROVISIONS ARE TAKEN TO PLOT THE MAGNETIC INDUCTIONS, RING VOLTAGES, TEMPERATURE INCREASES ETC. AS FUNCTIONS OF TIME AND POSITION INSIDE ROTOR DURING BUILD-UP AND BREAKDOWN OF AMPERE TURNS. THE METHOD OF FINITE COMPLEX FOURIER TRANSFORM IS APPLIED TO SATISFY THE TIME-DEPENDENT BOUNDARY CONDITION WITH THE USE OF COMPLEX BESSEL FUNCTIONS FOR THE COEFFICIENTS, SATISFYING THE TIME INDEPENDENT BOUNDARY CONDITIONS.

704 REFERENCES

FILE CODES

D3

769 RE192 SLENDERELLA 2

REQUESTOR A. SMITH

REACTOR ENGINEERING

PROGRAMMER M. SCHLAPKOHL

CALCULATES HISTOGRAMS OF LINEAR FUNCTIONS OF EXPERIMENTAL FISSION DATA AND COMBINATIONS OF THESE FUNCTIONS.

650 REFERENCES

FILE CODES

E0

770 RE193 SLENDERELLA 3

REQUESTOR A. SMITH

REACTOR ENGINEERING

THIS PROGRAM EXTENDS THE RANGE COVERED BY SLENDERELLA 2.

650 REFERENCES

FILE CODES

E0

771 RE EBRII MARKIII CONTROL SYSTEM ANALYSIS

REQUESTOR J. CARTER

REACTOR ENGINEERING

PROGRAMMER L. BRYANT

ANA REFERENCES

FILE CODES

774 RE TWO-PHASE NATURAL CIRCULATION LOOP

REQUESTOR K. GARLID

REACTOR ENGINEERING

PROGRAMMER G. HAWLEY

LUMPED PARAMETER DIFFERENTIAL EQUATIONS ARE SOLVED THAT DESCRIBE THE OSCILLATORY BEHAVIOR OF A TWO-PHASE CIRCULATION COOLING LOOP IN A REACTOR.

ANA REFERENCES

FILE CODES

777 PHY172 LEAST SQUARE FIT TO A GAUSSIAN FOR RESPONSE OF A SODIUM IODIDE CRYSTAL

REQUESTOR J. MONAHAN

PHYSICS

PROGRAMMER R. JULKE

RE-PROGRAMMING WITH MODIFICATIONS 629/PHY143 FOR USE ON GEORGE. MAJOR REASON FOR CHANGE TO GEORGE IS EXPERIMENTAL DATA TO BE PROCESSED IS TAKEN DIRECTLY ON PUNCHED PAPER TAPE (DATA DUE TO TRAIL AND RABOY).

GEO REFERENCES

FILE CODES

E2

780 RE195 SOLUTION OF DIFFERENTIAL EQUATIONS

REQUESTOR Y. CHANG

REACTOR ENGINEERING

PROGRAMMER M. SCHLAPKOHL

704 REFERENCES

FILE CODES

D2

781 RE196 STUDY OF ELASTIC MODERATION EFFECT

REQUESTOR H. HUMMEL

REACTOR ENGINEERING

CONSULTANT M. BUTLER

PROGRAMMER A. RAGO

THIS PROGRAM IS DESIGNED TO COMBINE A FEW (APPROXIMATELY 30) ENERGY GROUP CALCULATION WITH A MANY (APPROXIMATELY 440) GROUP ONE, TO STUDY IN DETAIL THE EFFECT OF ELASTIC MODERATION ON REACTOR SPECTRA. SPATIAL INDEPENDENT CALCULATIONS ALLOW OPTIONS FOR THE DIFFUSION, ASYMPTOTIC TRANSPORT, CONSISTENT P-1, OR CONSISTENT B-1 APPROXIMATION.

704 REFERENCES

FILE CODES

Z0

782 IINSE ANALOG COMPUTER COURSE

REQUESTOR M. GROTENHUIS INTERNATIONAL INSTITUTE

PROGRAMMERS L. BRYANT, L. JUST

A SERIES OF THREE EXPERIMENTS TO ILLUSTRATE THE APPLICATION OF ANALOG COMPUTERS TO REACTOR KINETICS PROBLEMS.

ANA REFERENCES

FILE CODES

785 PAD117 CONSTANT FREQUENCY CYCLOTRON CALCULATION

REQUESTORS L. TENG, E. CROSBIE PARTICLE ACCELERATOR

CONSULTANT L. WOS

PROGRAMMER R. JULKE

THIS PROGRAM CALCULATES THE FLUTTER AND SPIRAL REQUIRED TO PRODUCE A GIVEN VARIATION OF THE RADIAL AND VERTICAL BETATRON WAVELENGTHS WITH RADIAL POSITION OF THE EQUILIBRIUM ORBIT FOR A SPECIFIED CONSTANT FREQUENCY CYCLOTRON.

704 REFERENCES

FILE CODES

D2

787 PHY173 BETA SPECTRUM SHAPE CALCULATION

REQUESTOR S. BURSON

PHYSICS

CONSULTANT W. CODY

PROGRAMMER J. GREGORY

THE BETA SPECTRUM IS DECOMPOSED INTO ITS COMPONENTS BY FERMI ANALYSIS.

704 REFERENCES

FILE CODES

E2

788 PHY174 DISTRIBUTION OF THE SPACING BETWEEN NEIGHBORING LEVELS HAVING A DEFINITE NUMBER OF DIFFERENT SYMMETRY CHARACTERS

REQUESTOR N. ROSENZWEIG

PHYSICS

PROGRAMMER B. GARBOW

TABULATION OF THE FUNCTION $F(T)$ FOR A SPECIFIED RANGE OF T . $F(T)$ IS A COMBINATION OF POLYNOMIALS IN T , EXPONENTIAL IN T SQUARED, AND THE ERROR FUNCTION OF T .

704 REFERENCES

FILE CODES APSB 0 Z0

790 RE204 ONE-GROUP TRANSPORT THEORY ROUTINE (QUADE-HERMITE
INTEGRATION)

REQUESTOR L. TEMPLIN REACTOR ENGINEERING

CONSULTANT E. BAREISS PROGRAMMER C. CHAMOT

704 REFERENCES FILE CODES D0,D2

792 RE199 INELASTIC SCATTERING CROSS SECTION FOR CRYSTALLINE
MODERATORS

REQUESTOR V. JANKUS REACTOR ENGINEERING

CONSULTANT E. BAREISS PROGRAMMER D. JOHNSON

THE INELASTIC SCATTERING CROSS SECTION FOR CRYSTALLINE MODERATORS IS EVALUATED IN THE INCOHERENT APPROXIMATION USING MULTIPHONON EXPANSION FOR ARBITRARY DISTRIBUTION OF VIBRATION MODES, $\rho(\omega)$. TWO OUTPUT POSSIBILITIES ARE CONTEMPLATED -- NEUTRON SPECTRUM FOR A GIVEN INCIDENT ENERGY AND SCATTERING ANGLE, AND/OR INTEGRATED AND WEIGHTED MULTIGROUP CROSS SECTIONS.

704 REFERENCES FILE CODES Z0

793 UC108 LEAST SQUARES APPROXIMATION BY SINE, COSINE AND
EXPONENTIAL FUNCTIONS (S-5-195)

REQUESTOR C. WALKER UNIVERSITY OF CHICAGO

CONSULTANT W. MILLER PROGRAMMERS W. ROSENKRANTZ,
A. STRECOK

THE COEFFICIENTS THAT BEST FIT THE EXPERIMENTAL DATA TO AN ARBITRARY SET OF PRESCRIBED FUNCTIONS ARE DETERMINED.

GEO REFERENCES S-5-195 FILE CODES PS G0 E2

794 PHY175 PROCESSING OF RAW DATA CHOPPER TAPES

REQUESTOR L. BOLLINGER PHYSICS

PROGRAMMER S. ZAWADZKI

THIS PROGRAM ACCEPTS CHOPPER COUNT DATA IN VARIOUS FORMATS, CORRECTS FOR BACKGROUND AND COMPUTES WEIGHTING FACTORS IF REQUESTED. IN ADDITION, SUMS OF EVERY 256 CONSECUTIVE COUNTER RESPONSES ARE CALCULATED AND PRINTED.

GEO REFERENCES FILE CODES Z0

798 EL107 RESOLUTION EFFECTS IN NAI(TL) CRYSTALS

REQUESTOR W. MANAGAN ELECTRONICS

PROGRAMMER W. SNOW

RESOLUTION EFFECTS DUE TO LIGHT COLLECTION IN NAI(TL) CRYSTALS WILL BE CALCULATED BY THE MONTE CARLO METHOD, USING DATA OBTAINED FROM 443/AMD105 (MODIFIED).

GEO REFERENCES

FILE CODES

G6

799 PHY176 EQUILIBRIUM SHAPES FOR CHARGED LIQUID

REQUESTOR S. COHEN PHYSICS

PROGRAMMER A. BATES

THE FORCES ACTING ON A UNIFORMLY CHARGED LIQUID DROP ARE OF TWO TYPES A) THE COULOMBIC REPULSION AND B) THE SURFACE TENSION. FOR A GIVEN RATIO OF THE TOTAL COULOMBIC ENERGY TO THE SURFACE ENERGY IT IS POSSIBLE FOR SEVERAL EQUILIBRIUM SHAPES TO EXIST. THESE MAY BE STABLE OR UNSTABLE. ONE SHAPE OF EQUILIBRIUM IS THAT OF THE SPHERE. THE OBJECT OF THIS CALCULATION IS TO OBTAIN THE OTHER SHAPES OF EQUILIBRIUM AND VARIOUS PARAMETERS ASSOCIATED WITH THESE SHAPES. WE SHALL RESTRICT OURSELVES TO AXIALLY SYMMETRIC SYSTEMS.

704 REFERENCES

FILE CODES A

20

800 MET DIFFUSIVITY MEASUREMENT

REQUESTOR W. MCGONNAGLE METALLURGY

CONSULTANT F. MOREHOUSE

PROGRAMMERS L. JUST
W. SCOTT

THE TRANSFER OF INFRA RED RADIATION PULSES THROUGH A THIN METAL DISC WAS STUDIED TO DETERMINE THE FEASIBILITY OF THIS METHOD OF MEASURING CONDUCTIVITY.

ANA REFERENCES

FILE CODES

801 RE200 MONTE CARLO MULTIPLE SCATTERING CORRECTIONS

REQUESTOR A. SMITH

REACTOR ENGINEERING

PROGRAMMER G. DUFFY

USING MONTE CARLO METHOD, DETERMINE SINGLE AND DOUBLE SCATTERED NEUTRON FLUX FOR ELASTIC AND INELASTIC SCATTERING IN A CYLINDRICAL SAMPLE. THE PURPOSE OF THE CODE IS TO PERMIT CORRECTION OF EXPERIMENTAL SCATTERING DATA FOR MULTIPLE SCATTERING EFFECTS.

GEO REFERENCES

FILE CODES APS G0 G6

804 CEN HEAT TRANSFER IN A CONCRETE BLOCK HEATED BY A CURRENT CARRYING WIRE

REQUESTOR L. COLEMAN

CHEMICAL ENGINEERING

CONSULTANT F. MOREHOUSE

PROGRAMMERS W. SCOTT
L. JUST

THE TEMPERATURE DISTRIBUTION IN A CONCRETE BLOCK SUBJECT TO TIME VARYING TEMPERATURES ON THE SURFACE WAS DETERMINED.

ANA REFERENCES

FILE CODES

808 RE203 HEAT TRANSFER IN A FLOWING RADIATING MEDIUM

REQUESTOR R. VISKANTA

REACTOR ENGINEERING

PROGRAMMER I. BAKSYS

THE SOLUTION OF TWO NON-LINEAR SIMULTANEOUS DIFFERENTIAL EQUATIONS REPRESENTING THE DIMENSIONAL VELOCITY AND TEMPERATURE DISTRIBUTIONS. SIMULTANEOUS CONVECTION, CONDUCTION AND RADIATION ARE ALSO CONSIDERED.

704 REFERENCES ANL6170

FILE CODES

D0

814 RE205 THE EXACT INTEGRATION OF THE TRANSPORT EQUATION

REQUESTOR L. TEMPLIN

REACTOR ENGINEERING

CONSULTANT H. WILF

PROGRAMMER G. DUFFY

THIS PROGRAM WILL SOLVE THE ONE VELOCITY TRANSPORT EQUATION IN STRATIFIED PLANE GEOMETRY, WITH EXACT TREATMENT OF THE ANGULAR DEPENDENCE OF THE SOLUTION. THUS, IT MAY BE THOUGHT OF AS A SPHERICAL HARMONICS CODE.

IT HAS THE ABILITY TO CONSIDER ANISOTROPIC SOURCES, DISTRIBUTED OR CONCENTRATED IN SPACE, AND ANISOTROPIC SCATTERING. THE METHOD USED IS THE DIRECT NUMERICAL INTEGRATION OF THE TRANSPORT EQUATION IN INTEGRAL FORM. THE CODE HANDLES EITHER PERIODIC OR VACUUM BOUNDARY CONDITIONS.

704 REFERENCES

FILE CODES A

D0,D1

815 MET125 EIGENVECTORS OF TRIANGULAR MATRICES

REQUESTOR F. TARABA

METALLURGY

PROGRAMMER B. GARBOW

A GENERAL PROGRAM TO FIND THE EIGENVECTORS OF UPPER TRIANGULAR MATRICES

704 REFERENCES

FILE CODES PSB 0 F2

817 PHY177 PHY 49 ON THE 704

REQUESTOR P. MARION

PHYSICS

PROGRAMMER R. KING

CHOPPER TAPES AS PREPARED FOR PROCESSING ON GEORGE ROUTINE 302/PHY49 WILL BE PROCESSED ON THE 704. PROGRAM READS 1024 COUNTERS AND ASSOCIATED NUMBERS IN BINARY, CONVERTS TO DECIMAL, AND PRINTS.

704 REFERENCES 302/PHY49

FILE CODES SB 0 G1

818 IINSE ANALYSIS OF REACTOR TEMPERATURE TRANSIENT

REQUESTOR C. RUIZ

INTERNATIONAL INSTITUTE

PROGRAMMERS L. BRYANT
L. JUST

ANALYZE THE TEMPERATURE TRANSIENTS IN THE ARMY PACKAGE POWER REACTOR

ANA REFERENCES

FILE CODES

819 RE REACTOR FEEDBACK

REQUESTOR A. DALFES REACTOR ENGINEERING

PROGRAMMER L. BRYANT

CHECK EFFECTS OF VOIDS IN EBWR AT VARIOUS POWER LEVELS AT 550 PSI

ANA REFERENCES

FILE CODES

820 RE206 SOLUTION OF CLADDING MELT-THROUGH EQUATIONS

REQUESTOR G. GOLDEN

PROGRAMMER M. MCLEAN

704 REFERENCES

FILE CODES 0 D2

821 PHY178 ENERGY LEVELS OF AN ATOM IN AN EXTERNAL MAGNETIC FIELD
AND ASSOCIATED TRANSITION PROBABILITIES

REQUESTOR L. GOODMAN PHYSICS

CONSULTANT W. CHILDS PROGRAMMER A. STRECOK

THIS PROGRAM IS A MODIFICATION AND EXTENSION OF PROBLEM 429/PHY108

GEO REFERENCES

FILE CODES PS GO F2

823 PHY179 EFFECTIVE RANGE EXPANSION OF TOTAL NEUTRON CROSS
SECTIONS USING LEAST SQUARES METHOD

REQUESTOR K. SETH PHYSICS

PROGRAMMER B. GARBOW

704 REFERENCES

FILE CODES PSB O E2

825 RE208 FLOW DISTRIBUTION TEST

REQUESTOR J. KAELLIS REACTOR ENGINEERING

PROGRAMMER M. SCHLAPKOHL

CALCULATION OF PRESSURE DROP TO DETERMINE THE FLOW DISTRIBUTION
THROUGH AN ORIFICE PLATE.

704 REFERENCES

FILE CODES APSB O Z0

827 RE209 DSN

PROGRAMMER M. MCLEAN

THIS IS THE REVISED LOS ALAMOS SN TRANSPORT CODE FOR REACTOR PROBLEMS.

THE LA FLOCO II ASSEMBLY SYSTEM IS USED.

704 REFERENCES LAMS2339,2346,2260 FILE CODES D0,D1

828 RE210 DISTRIBUTION OF EIGENVALUES FROM MATRICES, THE
ELEMENTS OF WHICH ARE FUNCTIONS OF RANDOM NUMBERS

REQUESTOR P. MOLDAUER REACTOR ENGINEERING

PROGRAMMER G. DUFFY

THIS PROGRAM GENERATES THE ELEMENTS (EACH ELEMENT A FUNCTION OF A SUBSET OF A SET OF RANDOM NUMBERS) OF M, SQUARE, NTH-ORDER, REAL, SYMMETRIC MATRICES. IT THEN FINDS HOW THE DIFFERENCES OF ADJACENT EIGENVALUES ARE DISTRIBUTED WITH RESPECT TO VARIOUS SUBINTERVALS OF THE REAL LINE FOR THE M MATRICES, AND PROVIDES A HISTOGRAM SHOWING HOW MANY DIFFERENCES LIE IN EACH INTERVAL FOR THE M MATRICES.

THE DISTRIBUTION AND HISTOGRAM ARE PRINTED ALONG WITH THE PROBLEM PARAMETERS AND THE LAST RANDOM NUMBER USED IN THE SEQUENCE.

GEO REFERENCES FILE CODES APS GO F2

829 RE211 TDC

PROGRAMMER M. MCLEAN

THIS IS THE LOS ALAMOS 2-DIMENSIONAL NEUTRON TRANSPORT CODE FOR A FINITE CYLINDER.

THE FLOCO II ASSEMBLY PROGRAM IS USED.

704 REFERENCES LAMS2339,2346,2260 FILE CODES D0,D1

838 PHY181 NUMERICAL EVALUATION OF CONVOLUTION INTEGRAL

REQUESTOR A. WEINREB PHYSICS

PROGRAMMER B. GARBOW

704 REFERENCES FILE CODES PSB O D1,E2

841 RE212 SPECTRUM (GA)

REQUESTOR M. BUTLER

APPLIED MATHEMATICS

PROGRAMMER I. BAKSYS

THIS GENERAL ATOMICS PROGRAM CALCULATES THE INFINITE MEDIUM THERMAL SPECTRUM GIVEN THE SCATTERING KERNEL, THE ABSORPTION CROSS SECTION OF THE CONSTITUENT MATERIALS, ATOM DENSITIES AND THE SOURCE SPECTRUM REPRESENTING THE SLOWING-DOWN DENSITY AT EACH ENERGY FROM ALL ENERGIES HIGHER THAN THE MAXIMUM THERMAL ENERGY.

704 REFERENCES GAMD-754

FILE CODES PSB O D0

842 RE213 KRYOS-II (GA)

REQUESTOR M. BUTLER

APPLIED MATHEMATICS

PROGRAMMER I. BAKSYS

THIS GENERAL ATOMICS PROGRAM CALCULATES THE NORMALIZED SCATTERING KERNEL ACCORDING TO THE PHONON EXPANSION TREATMENT OF THE CRYSTALLINE SCATTERING MODEL, FOR A MAXIMUM OF 75 ENERGY POINTS.

704 REFERENCES GAMD-754

FILE CODES PSB O D0

843 PHY183 STATISTICAL PROPERTIES OF OBSERVED ATOMIC ENERGY LEVELS

REQUESTOR N. ROSENZWEIG

PHYSICS

PROGRAMMER L. KASSEL

A STUDY OF SOME STATISTICAL PROPERTIES OF EXPERIMENTALLY OBSERVED ATOMIC ENERGY LEVELS.

704 REFERENCES

FILE CODES PSB O M1

846 RE214

REQUESTOR R. LEYSE

REACTOR ENGINEERING

PROGRAMMER B. GARROW

SOLUTION OF 3 NON-LINEAR EQUATIONS.

704 REFERENCES ANE208

FILE CODES PS O C4

848 PAD123

REQUESTOR G. CALABRESE

PARTICLE ACCELERATOR

PROGRAMMER E. HOVORKA

1) THE NUMBER OF RECTIFIERS REQUIRED TO INSURE A SATISFACTORY LEVEL OF RELIABILITY IS DETERMINED BY A CALCULATION OF THE ARCBACK PROBABILITIES FOR ZGS RECTIFIER INSTALLATIONS DIFFERING IN THE NUMBER OF RECTIFIERS.

2) TIME VARIATIONS OF - MAGNET CURRENT, VACUUM CHAMBER FLUX DENSITY, INSTANTANEOUS MAGNET POWER REQUIREMENTS, ACCELERATING VOLTAGE AT THE TERMINALS OF THE R. F. GAPS, ETC. - ARE DETERMINED FOR SEVERAL DIFFERENT ZGS MAGNET TERMINAL VOLTAGE REGULATION MODES.

704 REFERENCES

FILE CODES

Z0,D2

849 AMD121 IBM 704-TO-GEORGE TRANSLATOR

PROGRAMMERS J. DENES, L. KASSEL, APPLIED MATHEMATICS
N. CLARK, M. FISHERKELLER,
K. HILLSTROM, N. PURCELL

TRANSLATE, ON THE 704, FORTRAN COMPILED PROGRAMS INTO GEORGE CODE.

704 REFERENCES

FILE CODES

Z0

GEO REFERENCES

FILE CODES

Z0

850 AMD122 EFFECT OF DEUTERON DISTORTION IN THE SCATTERING OF NEUTRONS BY DEUTERONS

REQUESTOR K. SMITH

APPLIED MATHEMATICS

1) SOLVE SECOND ORDER DIFFERENTIAL EQUATIONS FOR EIGENFUNCTIONS AND EIGENVALUES.

2) SOLVE SYSTEMS OF COUPLED EQUATIONS FOR AMPLITUDES AND PHASE SHIFTS.

3) USE PARAMETERS OF (2) IN A MATRIX TYPE PROBLEM FOR CROSS-SECTIONS.

704 REFERENCES

FILE CODES

D2,F2

853 MET126 ELASTIC SHEAR MODULI FOR URANIUM VERSUS TEMPERATURE AND DIRECTION

REQUESTOR E. FISHER

METALLURGY

PROGRAMMER C. CHAMOT

704 REFERENCES 548/MET110,647/MET118

FILE CODES APSB 0 F1,C1

854 MET127 DETERMINATION OF AN ACTIVATOR ENERGY SPECTRUM FROM
A SERIES OF ISOTHERMAL ANNEALING CURVES

REQUESTOR F. TARABA

METALLURGY

PROGRAMMER J. DICK

GEO REFERENCES

FILE CODES APS GO Z0

856 RE215 COMBINED FORCED AND FREE CONVECTION HEAT TRANSFER IN
TURBULENT FLOW

REQUESTOR M. OJALVO (PURDUE)

REACTOR ENGINEERING

PROGRAMMER J. KOERNER

SOLUTION OF TWO SECOND ORDER DIFFERENTIAL EQUATIONS REPRESENTING
THE DIMENSIONLESS VELOCITY AND TEMPERATURE DISTRIBUTION.

704 REFERENCES

FILE CODES

D2

857 RE216 TRIPARTITE DATA PROCESSING

REQUESTOR H. GREENSPAN

REACTOR ENGINEERING

PROGRAMMER I. BAKSYS

THIS JOB NUMBER COVERS PROGRAMS DEVELOPED FOR USE IN CONNECTION
WITH THE MODERATOR SCATTERING LAW EXPERIMENT BEING UNDERTAKEN JOINTLY
BY THE UNITED KINGDOM, CANADA, AND THE UNITED STATES.

IN THE EXPERIMENT THE DISTRIBUTION IN ANGLE AND ENERGY OF NEUTRONS
SCATTERED FROM AN ORIGINALLY MONOKINETIC PULSED BEAM IS MEASURED BY A
SYSTEM OF SCINTILLATION NEUTRON DETECTORS AND A TIME SORTER. THE 30
DETECTORS ARE ARRANGED IN TWO QUADRANTS ROUND THE SCATTERING SAMPLE
AND THE COUNTS FROM EACH ARE SORTED BY TIME OF ARRIVAL.

704 REFERENCES

FILE CODES

Z0

860 MET128 NEUTRON INTENSITY COMPUTATION

REQUESTOR L. HEATON

METALLURGY

PROGRAMMER B. GARBOW

CALCULATION OF NEUTRON INTENSITIES FROM THE RADIAL DISTRIBUTION
FUNCTION.

GEO REFERENCES 306/MET-15

FILE CODES PS GO D1

866 RE217 PDQ3 (WAPD)

REQUESTOR L. TEMPLIN

REACTOR ENGINEERING

PROGRAMMER J. KOERNER

PDQ3 IS A NEW WESTINGHOUSE CODE IN THE PDQ SERIES WHICH SOLVES A LARGE CLASS OF 2-DIMENSIONAL REACTOR PROBLEMS. IT USES LINE RELAXATION AS OPPOSED TO THE PDQ2 POINT SCHEME AND THEREBY ACHIEVES A SPEED INCREASE. IT TREATS ONLY X-Y GEOMETRY AND ALSO DOES NOT CONTAIN A FLUX WEIGHTING ROUTINE OR SPECIAL SOURCE EDIT ROUTINE.

IT DOES, HOWEVER, ALLOW 7500 MESH POINTS AND A NONZERO CHI VALUE IN THE THERMAL GROUP.

704 REFERENCES

FILE CODES P DO

867 PHY186 MONTE CARLO ANALYSIS OF DISTRIBUTION OF WIDTHS

REQUESTOR L. BOLLINGER

PHYSICS

PROGRAMMER W. SNOW

A MONTE CARLO CALCULATION TO TEST THE HYPOTHESIS THAT THE PHYSICAL SAMPLE OF WIDTHS IS DRAWN FROM A POPULATION SATISFYING A SPECIFIED DISTRIBUTION.

GEO REFERENCES

FILE CODES G6

868 RE218 UNIVAC CROSS SECTION PREPARATION

REQUESTOR L. TEMPLIN

REACTOR ENGINEERING

PROGRAMMER S. KATILAVAS

A FORTRAN PROGRAM TO TAKE DATA PUNCHED DIRECTLY FROM REACTOR COMPUTING GROUP CROSS SECTION LIBRARY FORM SHEETS AND PUNCH UNIVAC CROSS SECTION INPUT CARDS.

704 REFERENCES

FILE CODES ZO

869 RE219 TUT-T5- A 2-DIMENSIONAL MONTE CARLO CALCULATION
OF CAPTURE PROBABILITIES (WAPD)

REQUESTOR C. KELBER

REACTOR ENGINEERING

PROGRAMMER I. BAKSYS

A WESTINGHOUSE PROGRAM WHICH CALCULATES, FOR A ONE-ENERGY MODEL, A REGIONWISE DISTRIBUTION OF CAPTURE PROBABILITIES IN A 2-DIMENSIONAL QUARTER-CELL BY A MONTE CARLO METHOD. AS MANY AS 32 REGIONS MAYBE TREATED, ALL OF DIFFERENT MATERIAL CONTENT, BUT OF UNIFORM CONTENT WITHIN EACH REGION. ALSO CALCULATES ERROR ESTIMATES FOR EACH PROBLEM.

704 REFERENCES WAPD-TM-125

FILE CODES PSB O G6

870 RE220 FIRE (LOS ALAMOS)

REQUESTOR D. OKRENT

REACTOR ENGINEERING

PROGRAMMER J. KOERNER

NUMERICAL SOLUTION OF DIFFUSION EQUATION FOR 1-DIMENSIONAL SLAB, CYLINDER, OR SPHERE GEOMETRIES OF MULTI-LETHARGY GROUP TYPE USING MANY SPACE POINTS AND WITH MULTI-REGION CAPACITY. INCLUDES HYDROGEN, CONTINUOUS SLOWING DOWN, INELASTIC SCATTERING, AND NEUTRON TEMPERATURE EFFECTS (SPEED-UP). A VARIABLE BUCKLING APPROXIMATION IS AVAILABLE FOR SYMMETRIC BARE REACTOR GEOMETRIES. IN THIS, ONLY THE AVERAGE FLUX IN EACH LEHARGY GROUP IS OBTAINED IN CONTRAST TO THE FLUX AT EACH RADIUS INTERVAL POINT IN THE MULTI-POINT FORM. AUXILIARY CODES ARE AVAILABLE FOR CHANGING THE MICROSCOPIC CROSS SECTION TAPE AND FOR CONVERTING SNG FORMAT CROSS SECTIONS TO FIRE FORMAT AND CONVERSELY, (A LOS ALAMOS PROGRAM).

704 REFERENCES LA2161

FILE CODES O D0

871 ID104 BELLEVILLE SPRING STUDY (WAPD)

REQUESTOR R. ADAMSON

IDAHO DIVISION

PROGRAMMER A. RAGO

STUDY OF THE FORCE-DEFLECTION CHARACTERISTICS OF A BELLEVILLE SPRING, A WESTINGHOUSE PROGRAM.

650 REFERENCES WAPD198

FILE CODES

Z0

875 PAD126 ACCELERATING COLUMN STUDY

REQUESTOR A. YOKASAWA PARTICLE ACCELERATOR

PROGRAMMER J. DICK

704 REFERENCES

FILE CODES

D3

876 RE ANALYSIS OF HIGH FLUX, CONSTANT POWER REACTOR

REQUESTOR C. KELBER REACTOR ENGINEERING

CONSULTANT F. MOREHOUSE PROGRAMMER L. JUST

THIS PROGRAM WILL COMPUTE CHARACTERISTICS OF A HIGH FLUX, CONSTANT POWER REACTOR OVER A FUEL CYCLE.

ANA REFERENCES

FILE CODES

878 PHY188 SPECTRAL MATRIX AND MODIFIED COUNT VECTOR GENERATION FOR GAMMA RAY DATA

REQUESTOR L. BOLLINGER PHYSICS

CONSULTANT L. WOS PROGRAMMER W. SNOW

THE USER SUPPLIES A REFERENCE SPECTRUM, RELATIVE INTENSITIES, AND A COMPLEX SPECTRUM (COUNT-VECTOR), OBTAINED FROM EXPERIMENT. BY LINEAR INTERPOLATION THE VARIOUS SPECTRA ARE GENERATED AND SUBTRACTED WEIGHTED BY THE CORRESPONDING INTENSITIES, FROM THE COMPLEX SPECTRUM TO PRODUCE THE MODIFIED COUNT-VECTOR.

GEO REFERENCES

FILE CODES

Z0

879 PHY189 DETERMINATION OF THE DOMINANT SPECTRUM OF A GIVEN COMPLEX SPECTRUM

REQUESTOR L. BOLLINGER PHYSICS

CONSULTANT L. WOS PROGRAMMER W. SNOW

THE PROGRAM IS GIVEN A COMPLEX SPECTRUM OBTAINED FROM EXPERIMENT, IT IS ALSO SUPPLIED AN APPROXIMATION TO THE SPECTRUM WHICH IS THE DOMINANT CONTRIBUTOR. GIVEN THE RELATIVE INTENSITIES OF THE VARIOUS SPECTRA WHICH MAKE UP THE COMPLEX SPECTRUM, BY ITERATION THE SHAPE OF THE DOMINANT SPECTRUM IS SOLVED FOR.

GEO REFERENCES

FILE CODES

Z0

880 EL108 GENERATION OF RANDOM SETS OF EXPONENTIAL DECAY TIMES

REQUESTOR C. ROCKWOOD ELECTRONICS

PROGRAMMER W. SNOW

COMPUTE THREE TABLES OF PLAUSIBLE DECAY TIMES, EACH WITH 5000 ENTRIES.

GEO REFERENCES

FILE CODES

G6

881 PHY190 R-MATRIX FORMALISM APPLIED TO NEUTRON DIFFERENTIAL SCATTERING FROM ZERO SPIN NUCLEI

REQUESTOR R. LANE PHYSICS

CONSULTANT W. CODY

PROGRAMMER W. GREENHOW

GEO REFERENCES

FILE CODES

E2

882 CHM122 ION TRAJECTORIES IN FRINGING MAGNETIC FIELDS OF CERTAIN POLEPIECES

REQUESTOR A. JAFFEY CHEMISTRY

CONSULTANT J. COOK

PROGRAMMER J. GREGORY

THIS IS CASE II AND CASE III OF PROBLEM 756/CHM121. FOR CASE II, AN INFINITELY THIN POLEPIECE, PARTS 1B AND 2 WILL BE COMPUTED. FOR CASE III, A POLEPIECE OF FINITE THICKNESS, ONLY PART 1B WILL BE COMPUTED.

704 REFERENCES

FILE CODES

D2

883 RE221 TKO (WAPD)

REQUESTOR M. BUTLER

APPLIED MATHEMATICS

PROGRAMMER J. HEESTAND

TKO A WESTINGHOUSE PROGRAM, SOLVES THE FEW-GROUP, TIME INDEPENDENT, NEUTRON DIFFUSION EQUATIONS IN X, Y, Z GEOMETRY. THE SOLUTION IS OBTAINED OVER A RECTANGULAR PARALLELEPIPED SYMMETRIC WITH RESPECT TO THE PLANE $X=Y$. ALL REGION INTERFACES MUST OCCUR AS MESH PLANES. INPUT PARAMETERS ARE SPECIFIED REGIONWISE, AND COMPLETELY VARIABLE MESH SPACING IS PERMITTED. THE NUMBER OF MESH POINTS ON AND TO ONE SIDE OF THE PLANE $X=Y$ IS LIMITED TO 4725 FOR 32,768 MEMORY. EITHER A ZERO FLUX OR A ZERO CURRENT BOUNDARY CONDITION MAY BE APPLIED AT EACH BOUNDARY PLANE.

704 REFERENCES WAPD-TM-143

FILE CODES PSB O D0

884 RE222 KINEMATICS OF TWO-BODY REACTIONS RELATIVISTIC (ACT)

REQUESTOR A. SMITH REACTOR ENGINEERING

CONSULTANTS J. MONAHAN PROGRAMMER I. BAKSYS
F. MOORING

CALCULATES THE ENERGETICS OF ANY TWO-BODY REACTION. FOR THE REACTION $X(I,F)Y$, THE LABORATORY KINETIC ENERGY T_F OF THE OBSERVED PARTICLE F IS CALCULATED AS A FUNCTION OF THE LABORATORY KINETIC ENERGY T_I OF THE INCIDENT PARTICLE I AND OF THE LABORATORY ANGLE BETWEEN THE DIRECTIONS OF INCIDENCE AND OBSERVATION.

704 REFERENCES ANL5219
GEO REFERENCES ANL5219

FILE CODES PSB 0 Z0
FILE CODES PSB 0 Z0

887 AMD123 K NEGATIVE - PROTON REACTION PROBLEM

REQUESTOR W. MILLER APPLIED MATHEMATICS

PROGRAMMER K. HILLSTROM

SEARCH FOR THE LOCATION OF THE MINIMA OF A FUNCTION OF MANY VARIABLES USING THE AMD(Z-14) PROGRAM.

THIS PROBLEM IS BEING DONE TO TEST THE USE OF THIS PROGRAM ON PROBLEMS WHERE THE MINIMA OF A FUNCTION OF MANY VARIABLES IS DESIRED.

GEO REFERENCES

FILE CODES E3

889 RPY116 LAGRANGIAN TURBULENCE CORRELATION

REQUESTOR P. FRENZEN RADIOLOGICAL PHYSICS

CONSULTANT J. COOK PROGRAMMER C. CHAMOT

SAME AS 301/RPY6 BUT FOR EVEN TIME INTERVALS.

704 REFERENCES 301/RPY6

FILE CODES

890 RPY117 UNFOLDING OF GAMMA-RAY SPECTRA

REQUESTOR H. LUCAS RADIOLOGICAL PHYSICS

CONSULTANT L. WOS PROGRAMMER W. SNOW

THE PROGRAM UNFOLDS GAMMA-RAY SPECTRA TO DETERMINE THE RELATIVE AMOUNTS OF THE VARIOUS ISOTOPES WHICH ARE PRESENT. THE PROGRAM IS SUPPLIED WITH THE SIMPLE SPECTRA. IT OPERATES IN SUCH A FASHION AS TO DIMINISH THE EFFECT OF STATISTICAL ERRORS IN THE EXPERIMENTAL DATA.

GEO REFERENCES

FILE CODES Z0

891 IINSE INTRODUCTION TO PACE ANALOG COMPUTER EXPERIMENTS

REQUESTOR M. GROTENHUIS INTERNATIONAL INSTITUTE

CONSULTANT F. MOREHOUSE PROGRAMMER L. BRYANT

A SERIES OF EXPERIMENTS TO INTRODUCE THE STUDENTS OF THE
INTERNATIONAL INSTITUTE TO ANALOG COMPUTER PROGRAMMING AND TECHNIQUES

ANA REFERENCES

FILE CODES

892 IINSE ARGONAUT POWER LEVEL (TRIP) SIMULTATION

REQUESTORS D. HABERMAN INTERNATIONAL INSTITUTE
W. STURM REACTOR ENGINEERING

PROGRAMMER L. BRYANT

ANA REFERENCES

FILE CODES

893 CEN METAL-WATER REACTIONS

REQUESTOR R. LIIMATAINEN CHEMICAL ENGINEERING

CONSULTANT F. MOREHOUSE PROGRAMMER L. JUST

THIS WILL BE A COMPARISON OF ANALOG RESULTS WITH EXPERIMENTS PER-
FORMED ON TREAT.

THE EQUATIONS FORMING THE MATHEMATICAL MODEL WILL BE FORCED WITH
A PLOT OF THE FLUX USED IN THE TREAT EXPERIMENTS AND VALUES FOR
CONSTANTS WILL BE INVESTIGATED.

ANA REFERENCES

FILE CODES

894 AMD124 ENERGY SPECTRUM OF ELECTRONS FROM NEGATIVE MUON DECAY
FROM BOUND ATOMIC STATES

REQUESTOR K. SMITH APPLIED MATHEMATICS

PROGRAMMER M. DITTMER

GEO REFERENCES

FILE CODES

C3,D2

896 AMD125 KERNELS FOR SCATTERING OF POSITRONS BY ATOMIC
HYDROGEN (POSCAT V).

REQUESTOR K. SMITH APPLIED MATHEMATICS

PROGRAMMER W. CODY

SUBROUTINES ARE CONSTRUCTED FOR EVALUATING THE FUNCTION $G(X)$,
WHERE $G(X)$ IS THE INTEGRAL FROM ZERO TO INFINITY OF $K(X,Y) F(Y)DY$,
 $K(X,Y)$ IS DEFINED IN ANL6121, AND $F(Y)$ IS A TABULATED FUNCTION.

704 REFERENCES ANL6121

FILE CODES APS 0 C3

897 RE223 GENERAL HEAT TRANSFER ANALYSIS

REQUESTOR H. HUMMEL REACTOR ENGINEERING

CONSULTANT W. MILLER PROGRAMMER M. SCHLAPKOHL

704 REFERENCES

FILE CODES DO

902 RPY118 STUDY OF RADON CONTENT

REQUESTOR H. LUCAS RADIOLOGICAL PHYSICS

PROGRAMMER R. JULKE

THIS PROGRAM CALCULATES THE RADON CONTENT OF A GIVEN SAMPLE AND
ITS ASSOCIATED ERROR FROM MEASUREMENTS AND ELAPSED TIME READINGS
TAKEN DURING THE EXPERIMENT.

GEO REFERENCES

FILE CODES Z0

903 CHM123

REQUESTOR J. HINDMAN CHEMISTRY

PROGRAMMER C. CHAMOT

704 REFERENCES ANE206

FILE CODES APSB 0 E2

905 ID105 GHT (ORNL)

REQUESTOR R. CUSHMAN

IDAHO DIVISION

PROGRAMMER G. DUFFY

THIS OAK RIDGE PROGRAM SOLVES STEADY-STATE AND/OR TRANSIENT HEAT CONDUCTION PROBLEMS IN ONE, TWO OR THREE DIMENSIONS, USING NUMERICAL INTEGRATION OF THE APPROPRIATE FINITE DIFFERENCE EQUATIONS. BOUNDARY TEMPERATURES AND HEAT GENERATION MAY BE A FUNCTION OF POSITION AND/OR TIME. MATERIAL PROPERTIES AND FILM COEFFICIENTS MAY BE CONSIDERED AS A FUNCTION OF POSITION BUT ARE ASSUMED CONSTANT WITH RESPECT TO TEMPERATURE AND TIME.

704 REFERENCES

FILE CODES P B O DO

906 AMD126 TEMPERATURE DISTRIBUTION DURING EXPONENTIAL INCREASE
IN POWER WITH ZERO CONVECTION HEAT TRANSFER

REQUESTORS H. SCHMIDT
J. CARTER

REACTOR ENGINEERING
REACTOR ENGINEERING

CONSULTANT N. MOREHOUSE

PROGRAMMER L. BRYANT

ANA REFERENCES

FILE CODES

907 PHY192 REVISED FORMAT MODIFICATIONS FOR CHOPPER DATA PROGRAMS

REQUESTOR P. MARION

PHYSICS

PROGRAMMER S. ZAWADZKI

THE ACQUISITION OF A NEW ANALYZER BY THE PHYSICS DIVISION WILL REQUIRE A SERIES OF CHOPPER DATA PROGRAMS TO BE MODIFIED TO ACCEPT THE COUNT DATA IN A NEW FORMAT. IN ADDITION, FOR EMERGENCY SITUATIONS A NEW CODE IS DESIRED WHICH WILL TAKE THE NEW FORMAT CHOPPER TAPES AND GENERATE EQUIVALENT OLD FORMAT CHOPPER TAPES. THESE TAPES THEN COULD BE USED, IF AND WHEN NECESSARY, WITH GEORGE PROGRAMS PREPARED TO ACCEPT THE OLD FORMAT TAPES.

GEO REFERENCES

FILE CODES

Z0

908 RE224 REACTOR ECONOMICS STUDIES

REQUESTOR L. LINK

REACTOR ENGINEERING

CONSULTANT L. WOS

PROGRAMMER J. HEESTAND

THE OBJECT OF THE PROGRAM IS TO COMPUTE THE COST IN MILLS PER KWH OF ELECTRICITY FOR VARIOUS EXPENSE AND REVENUE PARAMETERS. INITIALLY USE WILL BE MADE OF A PROGRAM DEVELOPED BY J. MC CAMPBELL OF AMERICAN STANDARD OR MODIFICATIONS THEREOF. FUTURE DEVELOPMENTS MAY RESULT IN CREATION OF A MORE INVOLVED PROGRAM OR THE CREATION OF ADDITIONAL PROGRAMS FOR OTHER REACTOR ECONOMICS OR PLUTONIUM COST STUDIES.

704 REFERENCES

FILE CODES

Z0

909 CHM MULTIPLE-ION TRAJECTORIES IN A NON-UNIFORM MAGNETIC FIELD

REQUESTOR G. MAVROGENES

CHEMISTRY

CONSULTANT N. MOREHOUSE

PROGRAMMER L. JUST

ION TRAJECTORIES IN A NON-UNIFORM MAGNETIC FIELD WERE STUDIED TO DETERMINE THE POSSIBILITY OF USING THE FIELD TO FOCUS THE IONS.

ANA REFERENCES

FILE CODES

911 UC110

REQUESTOR H. KOBRAK

UNIVERSITY OF CHICAGO

PROGRAMMER R. JULKE

TO SCAN A TAPE WITH ORDERED NUMBER PAIRS AND PRINT OUT AN ERROR INDICATION WHENEVER THE DIFFERENCE BETWEEN EITHER MEMBER OF TWO CONSECUTIVE PAIRS EXCEEDS A PREASSIGNED TOLERANCE.

GEO REFERENCES

FILE CODES

Z0

914 PHY193 SPHERICAL CAVITY FIELDS (KARO)

REQUESTOR A. HATCH

PHYSICS

PROGRAMMER A. STRECOK

THIS PROGRAM CALCULATED THE COMPONENTS OF AN ELECTROMAGNETIC FIELD IN A RESONANT SPHERICAL CAVITY AND THE ASSOCIATED SLATER FREQUENCY SHIFT DUE TO PLANE AND SPHERICAL PERTURBATIONS.

704 REFERENCES

FILE CODES APSB 0 C3

915 RE226 HEAT EXCHANGE BY THERMAL RADIATION IN A FLAT DUCT

REQUESTOR R. VISKANTA

REACTOR ENGINEERING

PROGRAMMER I. BAKSYS

THE PROBLEM IS A DETERMINATION OF TEMPERATURE IN A FLAT DUCT, USING THE STEFAN-BOLTZMANN LAW. THE HEAT TRANSFER BY THERMAL RADIATION IS THE ONLY MODE OF ENERGY TRANSFER CONSIDERED.

704 REFERENCES ANL6170

FILE CODES

D1

916 RE227 A PARAMETRIC STUDY OF THERMAL CONDUCTIVITY AND ABSORPTION COEFFICIENT VARIATION WITH TEMPERATURE DISTRIBUTION.

REQUESTOR R. VISKANTA

REACTOR ENGINEERING

PROGRAMMER I. BAKSYS

704 REFERENCES ANL6170

FILE CODES

C2

917 PHY194 CRYSTALLINE DOPPLER BROADENING

REQUESTOR H. JACKSON

PHYSICS

PROGRAMMER A. STRECOK

THIS PROGRAM IS USED FOR COMPUTING THE LINE SHAPE OF A SLOW NEUTRON CAPTURE RESONANCE UNDER THE ASSUMPTION THAT THE TARGET CAN BE CONSIDERED A DEBYE CONTINUUM.

GEO REFERENCES

FILE CODES APS GO C3

918 PHY195 LEAST SQUARES ANALYSIS OF BETA SPECTRA

REQUESTOR S. BURSON

PHYSICS

PROGRAMMER J. GREGORY

704 REFERENCES

FILE CODES

E2

922 AMD126 HARK

REQUESTOR H. COHN

APPLIED MATHEMATICS

CONSULTANT R. KING

PROGRAMMER T. CZAJA

THIS PROGRAM EVALUATES SPECIFIC TRIGONOMETRIC SUMS AND TESTS FOR INTEGERS.

GEO REFERENCES

FILE CODES

Z0

924 AMD127 FLIP DEVELOPMENT

REQUESTOR R. ASCHENBRENNER

APPLIED MATHEMATICS

PROGRAMMER C. HARRISON

GIVEN THE PIN NUMBERS FOR ALL THE PINS CARRYING THE SAME SIGNAL THE PROGRAM DETERMINES THE SEQUENCE OF PIN TO PIN CONNECTIONS WHICH MINIMIZES THE PATH LENGTH FROM SOURCE PIN TO TERMINAL PIN WITH ALL PINS CONNECTED BY NO MORE THAN TWO LINES.

THE PROGRAM GIVES A LIST OF PIN TO PIN CONNECTIONS AND THE WIRE LENGTH BETWEEN THESE TWO PINS FOR ALL PINS INCLUDED IN THE PATH.

PIN NUMBERS ARE THE LOCATION ON THE CHASSIS OF THE PIN.

704 REFERENCES

FILE CODES

S0

927 RE229 AX-2

REQUESTOR D. OKRENT

REACTOR ENGINEERING

PROGRAMMER J. HEESTAND

TO REPLACE THE SNG PORTION OF AX-1 WITH DIFFUSION THEORY.

704 REFERENCES

FILE CODES

D0

928 RE230 TURBO (WAPD)

REQUESTOR C. KELBER

REACTOR ENGINEERING

PROGRAMMER D. JOHNSON

THE WESTINGHOUSE 2 DIMENSIONAL DEPLETION CODE FOR 2 OR 4 ENERGY GROUPS (DIRECT COUNTERPART OF THE 1 DIMENSIONAL CODE, CANDLE).

704 REFERENCES WAPD-TM-95

FILE CODES

D0

929 CHM125 EXTENSION OF 707/CHM115A

REQUESTOR A. JAFFEY CHEMISTRY

PROGRAMMER K. HILLSTROM

704 REFERENCES

FILE CODES APSB 0 C3,D1

930 CHM126 THE CALCULATION OF CURVES TO FIT PARAMAGNETIC RESONANCE ABSORPTION SPECTRA OF CRYSTALS USING TWO EFFECTIVE NUCLEAR MAGNETIC MOMENTS PER MOLECULE.

REQUESTORS J. WEIL, G. GOODMAN CHEMISTRY

PROGRAMMER A. STRECOK

PARAMAGNETIC RESONANCE ABSORPTION SPECTRA HAVE BEEN OBTAINED IN GRAPHIC FORM FOR SINGLE CRYSTALS CONTAINING MOLECULES OF PEROXO-AMMINEDICOBALT NITRATE. MANY OF THE GENERAL FEATURES OF THESE SPECTRA HAVE BEEN EXTRACTED BY VISUAL INSPECTION, AND HAVE LED TO PRELIMINARY THEORETICAL UNDERSTANDING OF THE ELECTRONIC STRUCTURE OF THE SUBSTANCE. HOWEVER, THE QUANTITATIVE EVALUATION OF THOSE MOLECULAR PROPERTIES REVEALED BY THESE SPECTRA CAN ONLY BE OBTAINED BY FITTING THE EXPERIMENTAL CURVES WITH ANALYTIC CURVES. PREVIOUS WORK IN WHICH RESONANCE SPECTRA FROM SOLUTIONS OF THESE COMPLEXES WERE FITTED USING COMPUTER TECHNIQUES PROVED TO BE VERY SUCCESSFUL.

GEO REFERENCES

FILE CODES

E2

931 CHM127 NP(V)-U(VI) COMPLEXING

REQUESTOR A. ZIELEN CHEMISTRY

PROGRAMMER B. GARROW

704 REFERENCES ANE208

FILE CODES PSB 0 E2

933 RE231 ISOTOPIC DECAY AND PRODUCTION IN REACTORS

REQUESTOR H. ISKENDERIAN REACTOR ENGINEERING

PROGRAMMER L. BRYANT

ANA REFERENCES

FILE CODES

935 RE232 FLIP (WAPD)

REQUESTOR H. ISKENDERIAN REACTOR ENGINEERING

PROGRAMMER M. SCHLAPKOHL

704 REFERENCES WAPD-TM-134

FILE CODES

D0

937 CHM128

REQUESTOR J. SULLIVAN

CHEMISTRY

PROGRAMMER B. GARBOW

704 REFERENCES ANE208

FILE CODES PSB 0 E2

938 UC112 DETERMINATION OF STARTING VALUES FOR 887/AMD123

REQUESTOR R. DALITZ

UNIVERSITY OF CHICAGO

PROGRAMMER J. DICK

THIS PROGRAM IS UNDERTAKEN TO DEVELOP A PROCEDURE FOR SELECTING APPROPRIATE STARTING VALUES OF $A(0)$, $A(1)$, $B(0)$, $B(1)$ FROM GIVEN VALUES OF $SIGMA(1)$, $SIGMA(2)$, $SIGMA(3)$, R AND S FOR USE IN THE MINIMIZATION PROGRAM 887/AMD123.

GEO REFERENCES

FILE CODES

C3

939 CHM129

REQUESTOR L. KATZIN

CHEMISTRY

PROGRAMMER B. GARBOW

704 REFERENCES ANE208

FILE CODES PSB 0 E2

940 AMD128 NUMERICAL SOLUTION OF THE SCHRODINGER EQUATION FOR CENTRAL FIELDS

REQUESTOR W. CODY

APPLIED MATHEMATICS

PROGRAMMER R. JULKE

SCHRODINGERS WAVE EQUATION IS SOLVED BY A SCHEME INVOLVING THE BEST FEATURES OF 616/AMD115 AND A SCHEME PROPOSED BY S. SKILLMAN, (MTAC, VOL. 13, P299-302).

GEO REFERENCES

FILE CODES

D2

943 CU101 SEMI-ANNUAL DIVIDEND COMPUTATION

REQUESTOR J. CHONKO CREDIT UNION

PROGRAMMER T. MICHEL

A FORTRAN PROGRAM WHICH COMPUTES THE SEMI-ANNUAL DIVIDEND DUE EACH CREDIT UNION SHARE HOLDER.

704 REFERENCES

FILE CODES

M2

944 SSS103 SIMPSON'S ITERATION OF TABULATED FUNCTIONS

REQUESTOR R. KNOX SOLID STATE SCIENCE

PROGRAMMER A. STRECOK

USING A DATA SET CONSISTING OF INTEGRAND VALUES WHICH CORRESPOND TO EQUALLY SPACED VALUES OF THE INDEPENDENT VARIABLE, THREE INTEGRALS ARE OBTAINED.

GEO REFERENCES

FILE CODES

D1

945 IINSE115 UNSTEADY MOTION OF POWER LAW NON-NEWTONIAN FLUIDS

REQUESTOR D. MILLER INTERNATIONAL INSTITUTE

PROGRAMMER D. JOHNSON

704 REFERENCES

FILE CODES

D3

947 RPY119 RADON FLUX STUDY TEMPERATURE DATA

REQUESTOR J. PEARSON RADIOLOGICAL PHYSICS

PROGRAMMER D. RUSSELL

SOME AVERAGING PROCEDURES WITH FINAL POINT PLOTTING OF RESULTS ARE TO BE PERFORMED ON RUNS OF TEMPERATURE DATA AND WIND SPEED DATA.

704 REFERENCES

FILE CODES

E1

949 SSS104 ALMOST LINEAR DEPENDENCE OF A NON-ORTHOGONAL BASIS SET

REQUESTOR T. GILBERT SOLID STATE SCIENCE

PROGRAMMER M. YOSHIMINE

704 REFERENCES

FILE CODES

F2

950 SSS105 ENERGY-BAND PROGRAM FOR ZINC SULFIDE

REQUESTOR G. BASSANI SOLID STATE SCIENCE

PROGRAMMER M. YOSHIMINE

GENERAL SCHEME FOR SUBSTITUTING APPROPRIATE PARAMETERS INTO THE MATRIX ELEMENTS OF ELECTRONIC LEVELS IN THE ZINC BLEND STRUCTURE (SOLUTION OF THE SECULAR EQUATIONS).

704 REFERENCES

FILE CODES

F0

951 SSS106 JACOBI DIAGONALIZATION OF CERTAIN MATRICES

REQUESTOR R. KNOX SOLID STATE SCIENCE

PROGRAMMER M. YOSHIMINE

THE MATRICES (2X2, 2X2, 3X3) ARE TO BE DIAGONALIZED FOR VARIOUS VALUES OF PARAMETERS APPEARING IN THE MATRIX ELEMENTS.

704 REFERENCES

FILE CODES

F1

952 SSS107 UHF-SCF NO. 2, UNRESTRICTED HARTREE-FOCK PROGRAM

REQUESTOR T. GILBERT SOLID STATE SCIENCE

PROGRAMMER M. YOSHIMINE

THIS IS TO BE A GENERALIZED EXTENSION OF THE UHF-SCF NO.1 PROGRAM, 516/SS(CHM111).

704 REFERENCES 516/SS(CHM111)

FILE CODES

F2

953 AMD129 TUBE LIFE

REQUESTOR S. HANSON APPLIED MATHEMATICS

PROGRAMMER P. TONNE

SUM, TOTAL AND TABULATE LIFE FIGURES ON VARIOUS TUBES USED IN GEORGE.

704 REFERENCES

FILE CODES

M2

956 PHY196 EVALUATION OF QUADRUPE INTEGRAL GIVING FRACTION OF
 LIGHT ORIGINATING IN A CYLINDER REACHING CYLINDER WALL

REQUESTOR W. ANDERSON PHYSICS

PROGRAMMER D. JORDAN

704 REFERENCES 542/RPY113

FILE CODES APSB 0 D1

PROGRAMMING SYSTEMS AND LIBRARY ROUTINES

Abstracts of 704 Newsletters

The 704 Newsletter is published at irregular intervals and contains information of interest to users of the IBM 704 and its related equipment. This information includes abstracts of SHARE correspondence and titles and subject classification of routines distributed by the SHARE Distribution Agency.

704 Newsletter No. 8

7/8/59

Consecutive Number Punching Device for the IBM 721 Punch installed.

New built-in functions added to Argonne's FORTRAN systems tape.

Recent SHARE Secretary correspondence.

Recent SHARE distributions.

704 Newsletter No. 9

9/29/59

Reports on SHARE XIII meeting

Additional built-in functions on Argonne's FORTRAN systems tape.

32K memory unit expected soon.

Backspace File (BSF, -0764) order installed and operating.

557 Interpreter installed.

Change in Consecutive Number Punching Device.

Description of Row Delete Device on 024 Card Punch in 704 machine room.

Recent SHARE Secretary correspondence.

Recent SHARE distributions.

704 Newsletter No. 10

1/6/60

Description of new FORTRAN input/output routines.

Additional FORMAT features in FORTRAN

Determination of temporary upper memory locations used by FORTRAN loader.

Correction to FORTRAN II manual.

Note on range of FORTRAN fixed point integers.

F-type input permitted with E-type FORMAT.

704 Newsletter No. 10 (cont'd.) 1/6/60

Miscellaneous information about FORTRAN.

Complete set of IBM manuals in SHARE library.

704 Newsletter No. 11 1/20/60

Recent SHARE Secretary correspondence.

Recent SHARE distributions.

704 Newsletter No. 12 3/8/60

Reports on SHARE XIV meeting.

Description of IBM 1401 system.

Change in XLOC - function on Argonne's FORTRAN systems tape.

IBM type 776 Tape Switching Device installed.

Recent SHARE Secretary correspondence.

Recent SHARE distributions.

704 Newsletter No. 13 6/30/60

Boolean constants in FORTRAN.

IBM 082 Sorter installed.

Recent SHARE Secretary correspondence.

Recent SHARE distributions.

Abstract of GEORGE Bulletins

The GEORGE Bulletin is published at irregular intervals and contains current information and news of interest to users of GEORGE and its related equipment. Following is a list of the topics discussed in bulletins published during this period.

GEORGE Bulletin No. 8.

10/7/59

Wide Magnetic Tapes available for use. Their orders described in detail.

Service Routines revised and assembled on one reel, for ease in loading and use.

Special Floating Point Input Routine (B-7-197) revised.

Subroutine Loader (X-1-126) revised to allow loading subroutines from two reels.

Two Data-Plotter symbol codes changed.

Tables of Useful Constants (decimal and sexadecimal) made available.

GAR (GEORGE Assembly Routine) completed. Corrections and additions to GAR description in the GEORGE Programming Manual listed.

GEORGE Bulletin No. 9

1/25/60

Floating Point Arithmetic Routine (D-1-115) revised to eliminate underflow stop.

Subroutine Bibliography error - Spherical Bessel Function Routine (F-6-238) should be listed as Floating, rather than Fixed Point.

Wide Magnetic Tape Unit 3 restricted to engineering use only, until further notice.

Narrow Magnetic Tape Output Unit and Cathode Ray Tube on-line plotter are to be available shortly.

GEORGE Bulletin No. 10

4/6/60

Character Codes for printing tapes on off-line equipment, changed to keep all input-output units as compatible as possible. List of new codes included in Bulletin.

"Copy and Load 6-bit Message" orders on GEORGE changed, and the new orders described.

Input-Output Instruction Scanner Routine (K-23-262) made available, to facilitate changing programs to incorporate new character codes.

Subroutine Additions for the IBM 704

<u>NUMBER</u>	<u>TITLE</u>	<u>REMARKS</u>
C203	Zeros of a Polynomial in Double Precision	Share Dist. 766
D106	Numerical Integration by Midpoint Procedure	
E206	Least Squares Polynomial Fit	Share Dist. 772
F202	Eigenvalues and Eigenvectors of a Real Symmetric Matrix	Share Dist. 664
F402	Matrix Inversion with Accompanying Solution of Linear Equations	Share Dist. 664
F403	A General Program for Matrix Inversion and Linear Equations	
N211	Floating Decimal Dump to Tape	
Q002	A SAP3-7 Off-line Output Modifying Subroutine	
Z009	Demonstration Program	
Z010	FORTRAN II On-line to Off-line Output Modifying Subroutine	Share Dist. 637
Z011	FORTRAN II Off-line to On-line Output Modifying Subroutine	Share Dist. 637
Z012	FORTRAN II On-line to Off-line Input Modifying Subroutine	Share Dist. 637
D204	Numerov Integration Subroutine	
AN SAP3-7	A Modified Version of the Original UA SAP3-7 to Result in Different Output Format Additional Built-in Functions Added to ANL's FORTRAN II System	
SWAPF } XSWAPF }	Routines to Exchange the Contents of Two Memory Locations for Floating Point and Fixed Point Respectively	
XSHIFTF	Routine to Shift a Fixed Point Integer ≤ 32767 from the Decrement Portion to the Address Portion of a Location or Vice Versa	
POWER2F	Routine to Multiply a Floating Point Number by any Integral Power of 2, using Fixed Point Addition Rather than Floating Point Multiplication (or Division)	

GEORGE Subroutine Additions

<u>NUMBER</u>	<u>TITLE</u>
B-21-263	General Output Routine
B-22-268	Plot Point, Cathode Ray Tube Plotter
B-23-266	Origin Translation, Cathode Ray Tube Plotter
E-23-256	N-th Root, Fixed Point
E-24-257	Cube Root, Fixed Point
E-25-267	Sine, Fixed Point
F-8-260	Spherical Bessel Functions, Floating Point
F-9-265	Logarithm of the Complex Gamma Function, Floating Point
I-14-264	Trigonometric Integrals, Floating Point
L-3-259	Linear Equation Solver, Floating Point
X-21-258	GAR Subroutine Conversion
X-22-261	GAR Tape Correction Routine
X-23-262	Input-Output Instruction Scanner

COMPUTER ENGINEERING AND EQUIPMENT

The function of the Computer Engineering Section is the design and development of computers and information processing devices which have specific application in the nuclear sciences. The present effort is directed toward (a) the completion of the GEORGE-FLIP Computer System and (b) the development of information retrieval and pattern recognition systems.

The GEORGE computer which commenced full time operation in November, 1957, has been a contribution to computer technology as well as a useful tool for the Laboratory. GEORGE is a 40-binary-digit, parallel, asynchronous, modified two-address, fixed-point machine. A floating-point arithmetic unit (FLIP) which performs significance arithmetic is under construction for operation with GEORGE. The complete GEORGE-FLIP system with approximate dates for completion of the various units is given below.

Planned GEORGE-FLIP System

The computing equipment described below is currently available in the Applied Mathematics Division for carrying out computations.

- 1) An IBM-704 digital computer equipped with:
 - a 32768 word magnetic core memory,
 - an 8192 word magnetic drum memory
 - up to nine on-line magnetic tape units, and
 - an off-line punched card to magnetic tape unit, as well as a magnetic tape to printer off-line unit.
- 2) The Laboratory-designed and built digital computer GEORGE, equipped with:
 - a 4096 word magnetic core memory,
 - paper tape input and output, and
 - 4 magnetic tape units for internal memory storage.
- 3) A PACE analog computer consisting of two computing consoles (which can be coupled) each complete with:
 - 28 integrating amplifiers,
 - 28 summing amplifiers,
 - 10 servo mechanisms,
 - 5 electronic multipliers,
 - 5 diode function generators, and
 - 80 scale factor potentiometers.
- 4) An Electronic Associates graph plotter operated from paper tape, punched card, or manual input.
- 5) A paper tape to punched card converter designed to make GEORGE output compatible with the 704 installation.

An IBM 1401 is expected in February, 1961 as replacement of the off line equipment in the 704 system.

- a) 1401 Model C3 (400 Character Storage) Central Processing Unit with:

- Feature Code 560 Multiply-Divide
- Feature Code 617 Print Storage
- Feature Code 167 Column Binary
- Feature Code 497 High-Low-Equal Compare
- Feature Code 27 Advanced Programming

- b) Type 1402 Model 1 Card Read Punch (800 cards/min)

- c) Type 1403 Model 2 Printer (600 lines/min)
- d) Type 722 (two units) Model II Tape Drive

PUBLICATIONS AND PAPERS

PUBLICATIONS

- 1) W. F. MILLER AND W. J. SNOW, ENERGY LOSS SPECTRA FOR GAMMA RAYS IN SODIUM-IODIDE, REV. SCI. INSTR. V31, 39 (1960).
- 2) J. C. SULLIVAN*, J. RYDBERG*, AND W. F. MILLER, THE USE OF HIGH SPEED DIGITAL COMPUTERS FOR THE LEAST SQUARES CALCULATION OF COMPLEXITY CONSTANTS, ACTA CHEM. SCAND., V13, 2023 (1959).
- 3) H. FRICKE* AND D. L. PHILLIPS, APPLICATION OF A HIGH SPEED ELECTRONIC COMPUTER IN DIFFUSION KINETICS. II. DEPLETION EFFECT IN THE SPHERICAL ONE RADICAL-ONE SOLUTE MODEL, J. CHEM. PHYS., V32, PP.1183-4 (APRIL, 1960).
- 4) H. L. GRAY AND C. HARRISON, JR., NORMALIZED FLOATING POINT ARITHMETIC WITH AN INDEX OF SIGNIFICANCE, 1959 PROC. EASTERN JOINT COMPUTER CONF., DEC. 1959.
- 5) H. S. WILF, THE NUMERICAL INTEGRATION OF THE TRANSPORT EQUATION WITH NO ANGULAR TRUNCATION, JOURNAL OF MATHEMATICAL PHYSICS, V1, P.225, (MAY-JUNE, 1960).
- 6) KENNETH SMITH, W. F. MILLER, AND A. J. P. MUMFORD**, THE ELASTIC AND INELASTIC SCATTERING OF ELECTRONS AND POSITRONS FROM THE S-STATES OF ATOMIC HYDROGEN, PROCEEDINGS OF THE PHYSICAL SOCIETY, (LONDON), IN PRESS.
- 7) KENNETH SMITH AND B. DEJON**, SHADOW EFFECT IN THE SCATTERING OF BEV PIONS AND NUCLEONS BY DEUTERONS, PROCEEDINGS OF THE PHYSICAL SOCIETY, (LONDON), IN PRESS.
- 8) J. M. COOK, ASYMPTOTIC PROPERTIES OF A BOSON FIELD WITH A GIVEN SOURCE, AMERICAN MATHEMATICAL SOCIETY NOTICES, V6, NO.7, P.824 (DEC.1959) (ABSTRACT).

- 9) J. M. COOK, REMARKS ON A RECENT PAPER, COMMUNICATIONS OF THE ASSOCIATION FOR COMPUTING MACHINERY, V2, NO.10 (OCT.1959).
- 10) F. SALTER, READY-MADE OSCILLATOR FOR FREQUENCIES BETWEEN 5 AND 50 MC, ELECTRONIC DESIGN, P.110 (JAN.1960) (LETTER).
- 11) W. F. MILLER AND W. J. SNOW, DESIGN CALCULATIONS FOR NAI SYSTEMS, REV. SCI. INSTR., IN PRESS (NOTE).
- 12) W. F. MILLER AND W. J. SNOW, RESPONSE SPECTRA FOR CSI CRYSTALS, REV. SCI. INSTR., IN PRESS.
- 13) E. H. BAREISS, RESULTANT PROCEDURE AND THE MECHANIZATION OF THE GRAEFFE PROCESS, JOURNAL OF ACM, IN PRESS.
- 14) H. H. HUMMEL*** AND A. L. RAGO, CALCULATION OF EFFECT OF ELASTIC SCATTERING BY LIGHT ELEMENTS IN FAST REACTORS, TRANS. AM. NUCLEAR SOC. 3(1) 273 (JUNE,1960) ABSTRACT.

* CHEMISTRY DIVISION

** BROOKHAVEN NATIONAL LAB.

*** REACTOR ENGINEERING DIVISION

ANL REPORTS

- 1) ANL-6039, MATRICES FOR TRANSFORMING LEGENDRE POLYNOMIAL COEFFICIENTS BETWEEN LABORATORY AND CENTER-OF-MASS SYSTEMS BY R. O. LANE*, W. F. MILLER, AND K. E. HILLSTROM.
- 2) ANL-6040, BASIS AND DIMENSION IN ABSTRACT MODULE THEORY BY RICHARD CHICHESTER, JR.
- 3) ANL-6075, FUNDAMENTAL COMPONENTS OF THE PACE ANALOG COMPUTER BY W. E. SCOTT.
- 4) ANL-6095, A GENERAL PROGRAM FOR CALCULATING CROSS-SECTIONS IN WAVE MECHANICS BY KENNETH SMITH.

* PHYSICS DIVISION

AMD TECHNICAL MEMORANDA

- 1) NO. 8, INTRODUCTION TO TRANSPORT THEORY CODES - PART 1, BY E. H. BAREISS.
- 2) NO. 9, INTEGRAL EQUATION FORMULATION OF THE SCATTERING OF ELECTRONS BY H-ATOMS, BY KENNETH SMITH AND W. J. CODY.

PAPERS PRESENTED AT MEETINGS

- 1) PROBLEMS IN THE NUMERICAL SOLUTION OF THE BOLTZMANN TRANSPORT EQUATION, INVITED ADDRESS BY E. H. BAREISS AT THE ANNUAL MEETING OF AMS AND SIAM, SALT LAKE CITY, UTAH, SEPT. 1959.
- 2) ASYMPTOTIC PROPERTIES OF A BOSON FIELD WITH GIVEN SOURCE BY J. M. COOK AT THE 66TH ANNUAL MEETING OF THE AMERICAN MATHEMATICAL SOCIETY, CHICAGO, ILLINOIS, JANUARY 28, 1960.
- 3) THE SOLUTION OF THE REACTOR KINETICS EQUATIONS FOR LARGE AND SMALL EXCURSIONS ON AN ANALOG COMPUTER, BY J. C. CARTER* AND N. F. MOREHOUSE, JR., PRESENTED AT THE AMERICAN NUCLEAR SOCIETY MEETING, CHICAGO, ILL., JUNE 14, 1960.
- 4) THE APPLICATION OF DIGITAL COMPUTERS TO COMPLEX SCIENTIFIC AND ENGINEERING PROBLEMS, PRESENTED BY W. F. MILLER AT THE 68TH ANNUAL MEETING, AMERICAN SOCIETY FOR ENGINEERING EDUCATION, LAFAYETTE, INDIANA, JUNE 21, 1960.

* REACTOR ENGINEERING DIVISION

SEMINARS, LECTURES AND COURSES
1959 SUMMER LECTURE SERIES
CONVEX SETS AND THEIR APPLICATIONS BY KY FAN (NOTES AVAILABLE)

APPLIED MATHEMATICS SEMINAR SERIES

- NOVEMBER 12, 1959 PROBLEMS IN DATA REDUCTION BY DR. JAMES A. WARD,
HOLLOMAN AIR FORCE BASE.
- NOVEMBER 17, 1959 ITERATIVE METHODS FOR SOLVING LINEAR EQUATIONS
BY PROFESSOR A. TAUB, UNIVERSITY OF ILLINOIS.
- NOVEMBER 19, 1959 RELATION BETWEEN PROGRAMMING LANGUAGES AND FORMAL
MATHEMATICS BY PROFESSOR ALAN J. PERLIS, CARNEGIE
INSTITUTE OF TECHNOLOGY.
- DECEMBER 3, 1959 THE OPTICAL DETECTION PROBLEM BY PROFESSOR H. L.
HUNZEKER, THE UNIVERSITY OF NEBRASKA.
- DECEMBER 10, 1959 A SCHEME FOR THE AUTOMATIC PROGRAMMING OF
ELECTRONIC CALCULATIONS BY H. B. MCINTOSH, RIAS,
BALTIMORE, MD.
- DECEMBER 17, 1959 APPROXIMATE SOLUTIONS OF PLANE PARALLEL TRANSPORT
PROBLEMS BY DR. PHILIP M. ANSELONE, MATHEMATICS
RESEARCH CENTER, UNIVERSITY OF WISCONSIN.
- DECEMBER 28, 1959 THE METHOD OF LANCZOS FOR TRI-DIAGONALIZING AN
ARBITRARY MATRIX BY PROFESSOR ROBERT T. GREGORY,
UNIVERSITY OF TEXAS.
- JANUARY 14, 1960 ON MATRICES PARTITIONED INTO BLOCKS BY PROFESSOR
ALEXANDER M. OSTROWSKI, UNIVERSITY OF BASEL,
SWITZERLAND, AND MATHEMATICS RESEARCH CENTER,
UNIVERSITY OF WISCONSIN.
- JANUARY 25, 1960 MOMENTS AND CHARACTERISTIC ROOTS BY DR. ALSTON
HOUSEHOLDER, OAK RIDGE NATIONAL LABORATORY.

FEBRUARY 5, 1960 POSITIVITY AND CRITICALITY BY PROFESSOR GARRETT BIRKHOFF, HARVARD UNIVERSITY.

FEBRUARY 25, 1960 ALGOL, THE INTERNATIONAL COMPUTER LANGUAGE BY DR. ALBERT A. GRAU, OAK RIDGE NATIONAL LABORATORY (PART I).

FEBRUARY 26, 1960 ALGOL, THE INTERNATIONAL COMPUTER LANGUAGE BY DR. ALBERT A. GRAU, OAK RIDGE NATIONAL LABORATORY (PART II).

MARCH 3, 1960 MECHANICAL LANGUAGES BY PROFESSOR SAUL GORN, DIRECTOR, COMPUTER CENTER, UNIVERSITY OF PENNSYLVANIA.

MARCH 17, 1960 PROGRAMMING SYSTEMS IN PARAMETRIC FORM BY JOHN K. ILIFFE, SENIOR RESEARCH ASSOCIATE, RICE INSTITUTE COMPUTER PROJECT.

MARCH 24, 1960 MATRICES AND LINEAR OPERATORS BY PROFESSOR CORNELIUS LANZOS, INSTITUTE FOR ADVANCED STUDIES, DUBLIN, IRELAND, AND MATH RESEARCH CENTER, UNIVERSITY OF WISCONSIN.

APRIL 14, 1960 THEORY OF APPROXIMATION BY PROFESSOR MICHAEL GOLOMB, DEPARTMENT OF MATHEMATICS, PURDUE UNIVERSITY.

APRIL 21, 1960 ON THE EHRENFEST MODEL OF STATISTICAL MECHANICS BY PROFESSOR J. H. B. KEMPERMAN, DEPARTMENT OF MATHEMATICS, PURDUE UNIVERSITY.

APRIL 29, 1960 ON CERTAIN CLASSES OF MATRICES WITH POSITIVE PRINCIPAL MINORS BY PROFESSOR KY FAN, DEPARTMENT OF MATHEMATICS, UNIVERSITY OF NOTRE DAME.

MAY 11, 1960

CIRCUITS USING TUNNEL DIODE-TRANSISTOR
COMBINATIONS BY PROFESSOR W. J. POPPELBAUM,
DIGITAL COMPUTER LABORATORY, UNIVERSITY OF
ILLINOIS.

MAY 26, 1960

THE FORMAL STRUCTURE OF COMMAND LANGUAGES BY
PROFESSOR JOHN CARR III, DIRECTOR, COMPUTATION
CENTER, UNIVERSITY OF NORTH CAROLINA.

JUNE 3, 1960

STARRED COMMUTATIVE MATRICES BY PROFESSOR MAGNUS
HESTENES, CHAIRMAN, DEPT. OF MATHEMATICS,
UNIVERSITY OF CALIFORNIA.

JUNE 16, 1960

THE EFFECT OF INCOMPLETE ITERATION IN THE
NUMERICAL SOLUTION OF MULTI-DIMENSIONAL TRANSIENT
HEAT CONDUCTION PROBLEMS BY PROFESSOR JAMES
DOUGLAS, JR., DEPT. OF MATHEMATICS, RICE INSTITUTE.

LECTURES PRESENTED AT MEETINGS

NUMERICAL SOLUTION OF SYSTEMS OF NON-LINEAR PARTIAL DIFFERENTIAL EQUATIONS OF PARABOLIC TYPE, SEMINAR BOEING SCIENTIFIC RESEARCH LABORATORIES, SEATTLE, WASHINGTON, BY E. H. BAREISS, AUGUST, 1959

APPLICATIONS OF THE MONTE CARLO TECHNIQUE, PRESENTED TO SEMINAR GROUP OF THE WESTERN ELECTRIC COMPANY, BY W. F. MILLER, SEPTEMBER 18, 1959.

LOGICAL DESIGN OF DIGITAL COMPUTERS, PRESENTED TO SCIENCE CLUB OF YORK COMMUNITY HIGH SCHOOL, ELMHURST, ILL., BY R. F. KING, SEPT. 24, 1959.

FRONTIERS IN COMPUTER DEVELOPMENT, PRESENTED TO THE AURORA CHAPTER OF THE NATIONAL MACHINE ACCOUNTANTS ASSOCIATION, BY W. F. MILLER, OCTOBER 8, 1959.

LOGICAL DESIGN OF DIGITAL COMPUTERS, PRESENTED TO MATHEMATICS CLUB OF LYONS TWP. HIGH SCHOOL, LAGRANGE, ILL., BY R. F. KING, NOV. 17, 1959.

FINDING SQUARE ROOTS ON A DIGITAL COMPUTER, PRESENTED TO A GROUP OF NORTH CENTRAL COLLEGE STUDENTS AND NAPERVILLE, ILL. RESIDENTS BY DONALD E. JOHNSON, FEBRUARY 3, 1960.

MATHEMATICS AND DIGITAL COMPUTERS, PRESENTED TO THE SCIENCE CLUB OF LEMONT HIGH SCHOOL, LEMONT, ILL., BY D. L. PHILLIPS, FEB. 15, 1960.

PROGRAMMING DIGITAL COMPUTERS, PRESENTED TO THE SCIENCE CLUB, YORK COMMUNITY HIGH SCHOOL, ELMHURST, ILL., BY W. GREENHOW, APRIL 28, 1960.

THREE EXAMPLES OF SCIENTIFIC COMPUTING, PRESENTED TO THE ROCK RIVER VALLEY CHAPTER OF THE NATIONAL MACHINE ACCOUNTANTS ASSOCIATION BY M. K. BUTLER, MAY 26, 1960.

AN ITERATIVE METHOD FOR CALCULATING CROSS-SECTIONS IN ATOMIC COLLISIONS PRESENTED AT THE ATOMIC ENERGY COMMISSION COMPUTER MEETING, BERKELEY, CALIFORNIA, BY KENNETH SMITH, JUNE 9, 1960.

COURSES IN APPLIED MATHEMATICS,
NUMERICAL ANALYSIS, AND PROGRAMMING

FORTRAN PROGRAMMING - 3 HOURS PER WEEK, FROM JULY 2 TO JULY 30, 1959.

INSTRUCTOR - BURTON S. GARBOW

CONTENTS - FORTRAN PROGRAMMING FOR THE IBM 704, INCLUDING NEW
FACILITIES OF FORTRAN II.

IBM 704 PROGRAMMING - 3 HOURS PER WEEK, FROM JULY 16 TO AUGUST 6,
1959.

INSTRUCTOR - JOHN E. DENES

CONTENTS - IBM 704 MACHINE AND SAP (SYMBOLIC ASSEMBLY PROGRAM)
LANGUAGES, PROGRAMMING, DEBUGGING, AND MACHINE OPERATION.

IBM 704 PROGRAMMING - 3-1/2 HOURS PER WEEK, FROM MARCH 21 TO APRIL
11, 1960.

INSTRUCTOR - JOHN E. DENES

CONTENTS - IBM 704 MACHINE AND SAP (SYMBOLIC ASSEMBLY PROGRAM)
LANGUAGES, PROGRAMMING, DEBUGGING, AND MACHINE OPERATION.

FORTRAN SYSTEMS SEMINARS - JUNE 16, 17 AND 21, 1960 - BY J. E. DENES
AND L. I. KASSEL - A DESCRIPTION AND DISCUSSION OF INNER WORKINGS OF
THE FORTRAN COMPILER FOR THE IBM 704 AND 709. THESE SEMINARS WERE
BASED ON THE FORTRAN SYSTEMS COURSE GIVEN BY IBM IN MAY, 1960 AND
WERE INTENDED FOR PROGRAMMERS FAMILIAR WITH FORTRAN.

COMPUTER SERVICES COUNCIL

The Computer Services Council met quarterly throughout the report period. The feature discussion for each session is listed below.

July 2, 1959

32,000 Word Memory for the IBM 704
Role of Small Computers in the Laboratory

October 2, 1959

Digital Read-Out and Recording Systems

January 15, 1960

New Commercial Computers

April 8, 1960

GEORGE-FLIP System