Computer Code Abstracts

SAIL

1. Code name: SAIL
2. Computer: IBM-7090—FORTRAN II coded
3. Nature of problem solved: The monoenergetic neutron transport equation is solved using the discrete S_n method for a one-dimensional plane cell. Various cell properties are computed.
4. Restrictions on the complexity of the problem: The code is limited to a single energy group, 100 regions, 100 intervals, and plane geometry. The order of approximation must be 2, 4, 6, or 8.
5. Typical running time: Generally less than 1 min. A sample S_4 problem involving 7 mesh points required 21 sec, including loading the program into memory.
6. Unusual features of the code: In writing the code, primary emphasis was placed upon ease in running multiple cases, and, in case of lack of convergence, upon restarting a problem at a later date. An S_2 calculation may be used to obtain a first approximation to a higher-order solution.
7. Present status: Production: available from Data Processing Library Services, International Business Machines Corporation, 787 First Avenue, New York, N. Y.
8. *Reference:* B. Carlson, Numerical solution of transient and steady-state neutron transport problems, LA-2260; B. J. Lemke, SAIL, NAA Program Description. (February 1961).

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SEAL-SHELL-1

1. Code name: SEAL-SHELL-1, a thin shell of revolution code
2. Computer: Philco 2000—FORTRAN II coded
3. Problem solved: SEAL-SHELL-1 determines stresses, deflections, and internal reactions in a thin shell of revolution loaded by pressure and axisymmetric forces and/or deflections at each end. The shell is approximated as a set of short conical segments which include cylinders and flat plates as limiting cases. The program determines the influence coefficients of end deflections versus end forces for each segment and connects the segments by equating deflections and solving for the redundant reactions. The shell is linear-elastic with thin-shell stress distribution, and the circumferential moment and force vary linearly in each segment. The shell may have segments of different thicknesses and may have middle surface shifts of the segments. Bending strains, shear strains, and pressure squeezing strains are included in the thin shell theory. The code has been successfully applied to such problems as (1) complete pressure vessel with a hemispherical head, cylindrical sides, and a flat bottom; (2) an omega seal weld; (3) a bellows; and (4) a nozzle attached to a sphere.
4. Restrictions: The maximum number of conical segments is 100.
5. Running time: About 2 or 3 min.
6. Present status: In use: available on request from Philco.
7. *Reference:* C. M. Friedrich, SEAL-SHELL—A digital program to determine stresses and deflections in an axisymmetric shell of revolution. WAPD-TM-277 (September 1961).

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TRG-RS(γ)

1. Code name: TRG-RS(γ)
2. Computer: IBM 704—Fortran coded
3. Nature of code: Monte Carlo calculation of gamma ray flux in a cylindrical detector. The gamma rays originate uniformly on the surface of a disk and pass through a complex shield configuration, the entire system being axially symmetric. The source gamma rays are monoenergetic. The source direction may be distributed according to a power of the cosine of the angle with the axis or given at a prescribed angle with the axis. At any point on the source the azimuthal distribution is assumed to be uniform. The energy and radial dependence of the flux at the detector is computed. A multicase feature allows the simultaneous calculation of flux from various source energies through various shield configurations.
4. Restrictions:
   10 spectral energy divisions
   12 shield materials
   16 axial shield divisions
   8 radial shield divisions per axial division
   8 radial detector divisions
   Machine requirements: 32K memory, 5 tape units, floating point trap
5. Typical running time: For deviations in the total flux less than 5%, about 5 min.
6. Unusual features: Importance sampling and generalized quota sampling used to reduce variance of results.
7. Present status: Advanced development. Deck available on request from H. Steinberg, TRG, Inc.
8. *Reference:* R. Aronson, K. Held, C. Klahr, and H. Steinberg, TRG-136-FR.

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