# Computer Code Abstract

## TASK-3

1. Name of Code: TASK-3.

2. Problems Solved: TASK-3 computes time-, space-, and angle-dependent neutron spectra by solving the multigroup discrete ordinate form of the one-dimensional transport equation in multiplying and nonmultiplying assemblies with a spatially distributed or a boundary source.

3. Method of Solution: TASK-3, like the original Code TASK, discussed in Refs. 1 and 2, employs a combined transfer-scattering algorithm and outer iteration.

4. Restrictions on the Complexity of the Problem: The principal constraints are available storage and central processor unit (CPU) time.

5. Computer: IBM-360 series.

6. Typical Running Time: An 18-group $S_4P_0$ calculation of steady-state neutron spectra in a 30.5-cm-thick beryllium prism having transverse dimensions 25.4 × 25.4 $cm^2$ and a spatially distributed upscattered source requires nearly 90 min on the IBM-360/44 machine.

7. Programming Language: FORTRAN IV.

8. Operating System: IBM-360/44 PS versions 3, level 5, programming system.

9. Machine Requirements: TASK-3 requires nearly 70K bytes of core memory for the program storage plus data block storage. Three magnetic tapes are needed in addition to the card reader, printer, and system disk.

10. Status: In use on IBM-360/44 machine.

11. Unusual Features of the Code: The code is capable of automatic termination of calculations after a specified number of iterations and can resume the calculations further without any loss of information. The code avoids the repeated evaluation of transfer and scattering matrices during each iteration. These matrices can be stored on a magnetic tape or disk pack before the iteration process begins. However, TASK-3 retains the flexible dimensioning scheme, of the original Code TASK, which allows the optimal use of core storage.

12. Other Programming Information: The program is structured in a multiphase program by the OVERLAY facility discussed in detail in Ref. 3. One of these phases (ROOT PHASE) remains in the central memory throughout the execution of the entire program and any of the subordinate phases can be loaded with overlay loading into the central memory whenever required. Essentially, an overlay represents the amount of program text in the central memory. The Code TASK-3 contains a root phase and three first-level and two second-level subordinate phases. The overall program control is vested in the main program and the subroutine BEGIN.

13. Availability: The program can be obtained from Computer Centre, University of Delhi, Delhi-110007, India.

14. Acknowledgments: We are indebted to R. B. Perez of Oak Ridge National Laboratory for providing a copy of the original TASK code. We are highly thankful to S. M. Luthra of the Delhi University Computer Centre for the help extended to us. One of us (SG) acknowledges the financial help from the Council of Scientific and Industrial Research, New Delhi-110001, India.

15. *References*:

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[2] R. A. LILLIE, "Incorporation of Outer Iteration into the TASK Algorithm," MS Dissertation, Graduate Council of the University of Tennessee (1972).

[3] "Guide to System Use for FORTRAN Programmers," 44 PS, Manual No. GC28-6813-2, International Business Machine Corporation.

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