13. Material available: (a) FORTRAN II source deck (on BCD tape) and sample problem and (b) reference document.

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CHAD

1. Name of Code: CHAD, for analysis of differential neutron scattering.

2. Computer for Which Code is Designed: IBM-7094. Programming Languages: FORTRAN IV (85%); MAP (15%).

3. Nature of Problem Solved: CHAD is designed to facilitate analysis and handling of differential neutron scattering data. It produces Legendre scattering coefficients from angular distribution data tabulated in many different formats. It can transform angular data into Legendre scattering coefficients in either the laboratory or the center-of-mass frame of reference. It calculates the average cosine of the scattering angle in the laboratory system and the average logarithmic energy decrement per elastic collision.

4. Method of Solution: A recursive method is used for calculating the transformation matrices which convert Legendre coefficients from one frame of reference (laboratory or center of mass) to the other. The Legendre scattering coefficients, the average cosine of the scattering angle in the laboratory system, and the average logarithmic energy decrement per elastic collision are obtained analytically from an angular distribution of scattered neutrons represented by a discrete set of points in either the laboratory or center of mass system, assuming that the differential cross-section is a linear function between points.

5. Restrictions on Complexity:
   30 Legendre coefficients;
   100 cosines of the scattering angle;
   Atomic mass > 1.0.

6. Typical Running Time: One minute for a case with 10 coefficients desired at 36 energy points, including printed, punched, and graphical output.

7. Unusual Features: CHAD punches output which is compatible with the Atomics International Evaluated Nuclear Data File (AIENDF). The program can use an SC-4020 graphical display device for plotting results.

8. Related and Auxiliary Programs: None.

9. Status: In production.

10. Machine Requirements: 32 k, IBM 7094.

11. Operating System: IBSYS

12. Any Other Programming or Operating Information or Restrictions: If an SC-4020 graphical display device is available, the subroutine DUMMY should be replaced with the subroutine AICRT3. The FORTRAN IV AICRT3 subroutine and the NAA SC-4020 subroutine package are available through: UAIDE Librarian, c/o Stromberg-Carlson, P. O. Box 2449, San Diego, California.

13. *References*:
    [1] R. F. Berland, "CHAD - Code to Handle Angular Data," North American Aviation Report NAA-SR-11231 (December 1965).
    [2] M. Hoffman and W. A. Rhodes, "AICRT3, A General Code for Display of Digital Data," North American Aviation Report NAA-SR-Memo-9069 (October 1963).

14. Material Available:
    a) Source deck (1400 cards)
    b) Sample case
    c) Documents
    d) Abstract

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