11. Acknowledgment: This paper is based on work performed under U.S. Atomic Energy Commission Contract AT(45-1)-1830.

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NØWIG

1. Name of Code: NØWIG[1]

2. Computer for Which Program is Designed and Programming Language Used: Written for CDC-6600 in FORTRAN IV.

3. Nature of Physical Problem Solved: NØWIG is a program for solving the one-dimensional two-group neutron diffusion and delayed precursor equations using a shape-specified, fixed flux ratio, point kinetics approximation. Feedback due to changes in the fuel metal temperature and coolant density is accounted for using a model which is identical with that used in the WIGL2[2] program.

4. Method of Solution: The appropriate kinetics and temperature equations are solved by a specified theta time differencing technique.

5. Restrictions on Complexity of the Problem: Two energy groups must be used and up to six groups of delayed neutron precursors may be used. The maximum number of spatial mesh points is 250 and up to 20 material compositions and 50 thermal-hydraulic channels may be specified.

6. Related and Auxiliary Programs: The initial conditions required for a NØWIG problem may be generated by use of the steady-state option of the WIGL3 program.[3] The WANDA[4] program may also be used to generate the initial NØWIG shape functions and adjoint weight functions.

7. Running Time: A transient problem with 31 spatial mesh points, 7 t.h. channels, one delayed group and 2000 time steps required 39 sec of computation time on a CDC-6600 computer.

8. Unusual Features: For the class of problems considered, NØWIG solves the same problem (using the same techniques) as the WIGL2[2] program, except that the assumption is made that the flux shape does not change during the transient time of interest. Hence, in the case where the true flux shape (and flux ratio) does not change, the NØWIG and WIGL2 solutions will be identical. This feature will permit the evaluation of shape change effects during transient conditions by means of NØWIG-WIGL2 comparisons.

9. Status: The program is in production and is available through the Argonne Code Center.

10. Machine Requirements: The program was written for a CDC-6600. Associated hardware is described in Ref. 5.

11. Operating System: The appropriate software and hardware associated with the system for which this program was written is contained in Ref. 5. This program was constructed within the SCOPE 3.1 operating system.

12. Other Programming or Operating Information or Restrictions: None.

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