

Letter to the Editor

On Comparison of Synthetic Kernel Transport Results

In the recent article by Henryson and Selengut¹ a "synthetic kernel" transport approximation is compared with P_1 and D_{16} results for a fixed source problem representing the fast group of a four-group PWR cell. The authors mention that they would also like to compare their results with an SP_3 approximation, but that an SP_3 solution for this problem could not be converged on the computer code they were using, ORNL's EXTERMINATOR.² This problem was originally formulated by I. Itkin of the Bettis Atomic Power Laboratory, and has received much study here. We can contribute the appropriate SP_3 results (see Table I, an extension of Table XII in Ref. 1).

These results were obtained with PDQ-7,³ a program which has not exhibited difficulty in converging SP_3 solu-

¹H. HENRYSON and D. S. SELENGUT, *Nucl. Sci. Eng.*, **37**, 1 (1968).

²T. B. FOWLER, M. L. TOBIAS, and D. R. VONDY, "EXTERMINATOR—A Multigroup Code for Solving Neutron Diffusion Equations in One and Two Dimensions," ORNL-TM-842, Oak Ridge National Laboratory (1961).

³W. R. CADWELL, "PDQ-7 Reference Manual," WAPD-TM-678, Bettis Atomic Power Laboratory (1967).

TABLE I

Summary of PWR Test Problems Results
Percent Error with Respect to D_{16}

Quantity/Method	D_{16}	P_1	Synthetic Kernel	SP_3
G_I	0.17398	+4.4	+2.3	+0.78
G_{II}	0.14977	+1.0	-0.5	-0.77
G_{III}	0.17419	+4.1	+2.1	+0.64
G_{IV}	0.25984	-9.9	-6.0	-2.59
G_V	0.24222	+3.9	+3.6	+2.23
$G_{Blanket}$	0.49794	+3.3	+1.4	+0.27
$G_{Blanket}/G_{Seed}$	1.9163	+14.7	+7.9	+2.93
Peak flux in seed	0.08903	-11.6	-7.0	-3.42

tions. We feel the convergence problem is with the application of EXTERMINATOR and not with the SP_3 approximation itself.

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