the boundary conditions have the form

$$\psi(\boldsymbol{x},\boldsymbol{w}) = A(\boldsymbol{x})m(w) \ , \quad \boldsymbol{x} \in \Gamma \ , \quad \boldsymbol{n}\cdot\boldsymbol{w} < 0 \ , \tag{3}$$

then an $O(1)$ boundary layer does not exist and the analysis of Ref. 1 is probably valid; conversely, if the boundary conditions cannot be written in the form of Eq. (3), then an $O(1)$ boundary layer does exist, and by analogy to the results in the above paragraph, the analysis of Ref. 1 is almost certainly not valid.

*Edward W. Larsen*

Los Alamos National Laboratory
University of California
Theoretical Division
P.O. Box 1663
Los Alamos, New Mexico 87545

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## Response to "Comment on 'Asymptotic Equivalence of Neutron Diffusion and Transport in Time-Independent Reactor Systems'"

The statement in our paper[1] concerned with the lack of rigor in previous publications on asymptotic problems in transport theory is, in fact, too strong for two reasons. First, there are apparently papers that treat the asymptotic limit of the solution to the transport equation in a rigorous way (see Refs. 2 through 8 from Ref. 2). Second, no matter how rigorous is the derivation, the asymptotic limit depends on the scaling of the original equation, which, almost inevitably, is of heuristic character.

The last statement might perhaps be an explanation of the differences in the results (and opinions) between us and Larsen.[2] Since our analysis seems to be rigorous (in the asymptotic sense), the result shows that any corrections to the boundary conditions for the diffusion equation obtained by us should be of order $O(\epsilon)$ with the particular scaling proposed in our paper. With a different scaling one can get another boundary condition. The two can differ from each other by terms of order $O(1)$, but that does not mean that either of the asymptotic analyses is mathematically erroneous, although one or the other might be superior from the physical point of view, depending on the particular problem to be studied.

Summarizing, we claim that with our scaling of the transport equation, the boundary condition for the diffusion equation derived in our paper takes properly into account the boundary layer up to terms of order $O(\epsilon)$. However we did not consider[1] whether there are cases of practical importance for which our assumptions are physically justified, although the answer seems to be positive, even in conditions far from criticality. In the example considered by Larsen,[2] the absorption term is taken to be identically equal to zero and the maximum time for a neutron to travel across the medium is infinite. This combination is excluded from our analysis, so it is impossible to compare the two approaches in that physical situation. Nevertheless, we think that the asymptotic analysis of the transport equation is very important, both from theoretical and physical points of view, and we hope that our paper has contributed in one way or another to this subject.

*Mieczyslaw Borysiewicz*
*Januss Mika**

Institute of Nuclear Research
Swierk, 05400 Otwock, Poland

*Giampiero Spiga*

University of Bologna
Nuclear Engineering Laboratory
40136 Bologna, Italy

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[1] M. BORYSIEWICZ, J. MIKA, and G. SPIGA, *Nucl. Sci. Eng.*, **81**, 110 (1982).
[2] E. W. LARSEN, *Nucl. Sci. Eng.*, **83**, 522 (1983).

*Present address: University of Strathclyde, Department of Mathematics, Livingstone Tower, Richmond Street, Glasgow G1 1XH, Scotland.