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LETTERS TO THE EDITORS

ON THE PAPER "TRANSIENT MASS TRANSPORT BETWEEN A FINITE VOLUME OF HOMOGENIZED FLUID AND A SPHERE WITH FINITE INTERFACIAL TRANSPORT COEFFICIENTS"

THE PROBLEM considered in [1] was solved earlier by several investigators. The reader will find a lot of references in [2], where the same problem for the finite body of arbitrary geometry by arbitrary initial distribution and arbitrary source function is studied. The special case analyzed by Farritor and Tao is a part of [3], where the cases of infinite slab, cylinder and sphere are solved and charts for the centre, the surface and the mean temperature as well as tables for the first 6 eigenvalue cover Biot number α from 0·001 to 100 and dimensionless volume β from 0·15 to 300 are given. Charts presenting the variation of fluid temperature have been published in [4].

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REFERENCES

1. R. E. FARRITOR and L. C. TAO, Transient mass transport between a finite volume of homogenized fluid and a sphere with finite interfacial transport coefficients, *Int. J. Heat Mass Transfer* **15**, 1179–1183 (1972).
2. M. D. MIKHAILOV, Body heating in bounded volume of finely mixed liquid, *J. Engng Phys.* **13**, 401–405 (1970).
3. M. D. MIKHAILOV, Wärme-oder Stoffübertragung an einfachen Körper in einem begrenzten Flûssigkeitsraum, *Forsch. Ingenieur.* **32**, 101–110, 147–150 (1966).
4. M. D. MIKHAILOV, *Non-stationary Heat and Mass Transfer in One-dimensional Bodies* (in Russian). AN BSSR, Minsk (1969).

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A COMMENT ON "RADIAL MASS TRANSFER EFFECTS IN A POROUS WALL TUBULAR REACTOR"

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IN A paper titled "Radial Mass Transfer Effects in a Porous Wall Tubular Reactor" which appeared recently in this Journal, Shah and Remmen [1] consider first the plug flow case which, though an oversimplification of the problem, gives closed form analytical solutions. However, the rejection coefficient, S, present in their laminar flow analysis for suction (equation (14) of [1]), does not appear in the plug flow model. The purpose of this note is to modify the plug flow model of Shah and Remmen so that it is consistent with their laminar flow analysis for all values of the rejection coefficient S, in the case of suction. The inclusion of S in an appropriate way is necessary if one wishes to compare more exact but more complicated models such as the laminar flow model with the simple plug flow model.

The dimensionless mass balance on reactant A, for a first order irreversible reaction can be written as

$$\frac{d(UC)}{dX} + K_1 C + (1 - S) C = 0. \qquad (1)^*$$

The last term in the left-hand side of the equation represents the reactant flux across the tube wall and is denoted by $\bar{F}_A$, in equation (1) of [1]. The above equation can also be obtained by averaging the corresponding laminar flow equation (equation (8) of [1]) over the cross section, using appropriate boundary conditions (equations (13) and (14)

* See [1] for Nomenclature. The definition of K_1 in equation (3) of [1] should be corrected to read $K_1 = (kR/2v_w)$ for bulk phase or homogeneous reaction.