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TWO PHASE FLOW IN A DOUBLY CONNECTED REGION

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Abstract

The effect of particle drag on rate of flow in an eccentric catheterized artery in doubly connected region is considered. Blood is treated as an incompressible Newtonian fluid with suspended particles. A two phase flow of Newtonian fluid in the region bounded by two eccentric cylinders C_1 and C_2 is studied analytically. The method involves mapping the eccentric circle in $x - y$ plane to $\xi - \eta$ plane through a conformal mapping $z = \frac{1}{1-\zeta}$ A closed form solution for velocity and rate of flow is obtained. Two-dimensional velocity profiles are plotted for different values of eccentricity and drag parameter. Numerical computation are carried out for the study of flow in the region, it reveals that the effect of increase in eccentricity facilitates transport of more fluid where as the effect of drag parameter is to reduce rate of flow and there by increase pressure.

Key Words : *Drag parameter, Eccentricity, Conformal mapping, Rate of flow.*