FLOW OF COUPLE-STRESS FLUID BETWEEN TWO ECCENTRIC CYLINDERS

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Abstract

Flow of couple-stress fluid flowing in an eccentric annulus is considered. This study has its importance, whenever simultaneous flow of two fluids has to be considered. The eccentric annulus in the domain D bounded internally by C1 and externally by C2 is mapped onto a concentric annulus bounded internally by 1 and externally by 2 using conformal mapping of the type z = c 1−& to a & −_ plane. A closed form solution is obtained. Two dimensional velocity profile is plotted for different couple-stress parameters, area of cross section and eccentricity parameter.

Numerical computation reveals that the use of eccentric annulus facilitates transport of more fluid. The rate of flow increases as eccentricity increases. Rate of flow increases with decrease in the couple stress parameter.