**Boundary layer stagnation point flow and heat transfer past a permeable exponentially shrinking cylinder**


ABSTRACT

The effect of surface mass flux on a stagnation point flow over a permeable exponentially stretching/shrinking cylinder is studied. Using an exponential similarity transformation, the governing mathematical equations are transformed into nonlinear ordinary differential equations which are then solved numerically. Effects of uniform suction and injection on the flow field and heat transfer characteristics are thoroughly examined. Different from a stretching cylinder, it is found that the solutions for a shrinking cylinder are non-unique. The results indicate that suction delays the boundary layer separation, while injection accelerates it. The range of stretching/shrinking parameter where the similarity solution exists is larger for the exponentially stretching/shrinking cylinder case compared to the linearly stretching/shrinking cylinder case.



**Keyword:** Boundary layer; Cylinder; Dual solutions; Exponentially shrinking; Heat transfer; Stagnation point flow; Suction/injection