

Numerical prediction of mixed convection heat transfer in an enclosure

Abstract :

In this article the transport mechanism of laminar mixed convection in a shear and buoyancy driven cavity flow with locally heated lower wall and moving cooled sidewalls is numerically studied using cubic interpolation profile method. This study focused on the interaction of forced convection with natural convection. The heat is locally introduced into the cavity with the dimensionless value of $e=1/5$ of the non dimensional length of the bottom wall. Studies were conducted on the effect of mixed convection parameter Gr/Re^2 (known as Richardson Number) in the range of 0.1-10. The results were illustrated in the form of streamline and isotherms. Three different regions can be detected as the Richardson number is increased: forced convection, mixed convection and natural convection.