

Natural convection heat transfer in two-dimensional region formed by constant heat flux horizontal flat tube concentrically located in cooled horizontal cylinder studied numerically. The model solved using the FLUENT CFD package. The numerical simulations covered a range of hydraulic radius ratio (5, 7.5, and 10) at orientation angles from (0° up to 90°).

The results showed that the average Nusselt number increases with hydraulic radius ratio, orientation angles and Rayleigh number. As well as enhancement ratio for Nusselt number at orientation angle 90° and hydraulic radius ratio 7.5 equal 24.87%. Both the fluid flow and heat transfer characteristics for different cases are illustrated velocity vectors and temperature contours that obtained from the CFD code. The results for the average Nusselt numbers are compared with previous works and show good agreement.