

NUMERICAL INVESTIGATION OF NUSSOLT NUMBER FOR NANOFLUIDS FLOW IN AN INCLINED CYLINDER

Numerical investigation is performed for the determination of Nusselt number of ZnO, TiO₂ and SiO₂ nanoparticles dispersed in 60% ethylene glycol and 40% water inside inclined cylinder for adiabatic and isothermal process. The present study was conducted for both the constant heat flux (10,000 W/m²) and constant wall temperature (313.15 K) boundary conditions. At the inlet, the uniform axial velocity and initial temperature (293 K) were assumed. The results show the change of average Nusselt number at Reynolds number (400), Rayleigh number (10⁶) and volume fraction percentage (2%). From results for adiabatic process when increasing the slope up to (45°), the Nusselt number augments, while Nusselt number is reduced by further tube inclination. As it is clearly seen, the highest value of Nusselt number is corresponded to (45°) and for isothermal process it is shown that the value of Nusselt number in horizontal position is higher than the vertical position. The values of Nusselt number ratio were evaluated to be (45%, 31%, 25%) for the three Nano fluids (ZnO, TiO₂ and SiO₂) respectively, with the insulation (adiabatic) and (36%, 27%, 22%) without insulation (isothermal) .