



HEAT TRANSFER ENHANCEMENT USING NANOFLUIDS IN LAMINAR IMPINGING JET FLOWS

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Abstract. *In this study, the problem of laminar impinging jet flows of nanofluids has been numerically investigated. Results, as obtained for water- Al_2O_3 mixture, show an enhancement of heat transfer rate due to the presence of nanoparticles in the base fluid. However, inclusion of particles in the flow increases shear stress and pressure drop. The effects of aspect ratio defined as the channel height to inlet jet diameter ($H/D=2,4$ and 6), Reynolds number ($Re=250, 500$ and 700), concentration of nanoparticles ($\Phi = 0,2,4$ and 6) on Nusselt number (Nu) and friction factor (f) have evaluated. The results show a 14.8-19.4% increase in average Nusselt number and 0-300% increase in average shear stress as particle concentration increases from 0 to 6%. It has been observed that the maximum average Nusselt number can be obtained using an aspect ratio equal to 4 and a 6% particle concentration. Finally, Thermal-hydraulic performance (η) was evaluated and it was seen that best performance can be obtained for $Re=500$ and $\Phi=6\%$.*

Key words: *Impinging jet, Nanofluids, Particles concentration, Thermal hydraulic performance*