

Unsteady Flow and Heat Transfer of Nanofluid from Circular Tube in Cross-Flow

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Abstract : Unsteady flow and heat transfer from a circular cylinder in cross-flow is studied numerically. The governing equations are solved by using finite volume method. Reynolds number varies in range of 50 to 200, in this range flow is considered to be laminar and unsteady. Al₂O₃ nanoparticle with volume fraction in range of 5% to 20% is added to pure water. Effects of adding nanoparticle to pure water on lift and drag coefficient and Nusselt number is presented. Addition of Al₂O₃ has inconsiderable effect on the value of drags and lift coefficient. However, it has significant effect on heat transfer; results show that heat transfer of Al₂O₃ nanofluid is about 9% to 36% higher than pure water.

Keywords : nanofluid, heat transfer, unsteady flow, forced convection, cross-flow

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