

Prediction of Unsteady Heat Transfer over Square Cylinder in the Presence of Nanofluid by Using ANN

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Abstract : Heat transfer due to forced convection of copper water based nanofluid has been predicted by Artificial Neural network (ANN). The present nanofluid is formed by mixing copper nano particles in water and the volume fractions are considered here are 0% to 15% and the Reynolds number are kept constant at 100. The back propagation algorithm is used to train the network. The present ANN is trained by the input and output data which has been obtained from the numerical simulation, performed in finite volume based Computational Fluid Dynamics (CFD) commercial software Ansys Fluent. The numerical simulation based results are compared with the back propagation based ANN results. It is found that the forced convection heat transfer of water based nanofluid can be predicted correctly by ANN. It is also observed that the back propagation ANN can predict the heat transfer characteristics of nanofluid very quickly compared to standard CFD method.

Keywords : forced convection, square cylinder, nanofluid, neural network

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