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STATISTICAL MODELING OF AVERAGE NUSSELT NUMBER

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ABSTRACT

In this study, an important heat transfer and fluid flow parameter is statistically modeled by using the data obtained from a numerical process. The two dimensional (2D), time dependent dimensionless equations of natural convection flow is numerically solved by global radial basis function (RBF) method. A trained data and a distinct test data, in which dimensionless numbers Rayleigh and Prandtl numbers are inputs and average Nusselt number is the output, are generated by saving the numerical results. Then, average Nusselt number is modelled by Trilayer Neural Network (TNN). A 2D curve fitting idea in view of interpolation is also examined. In terms of mean squared error metric, TNN gives the best goodness of fit results comparing to curve fitting. On the other side, it is shown that curve fitting is also an alternative for modelling. This modeling issue enables one to get the desired result without making heavy numerical calculations many times.

***K*eywords** Trilayer Neural Networks · global RBF · average Nusselt number · curve fitting

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