Competition of ANN and RSM techniques in predicting the behavior of the CuO-liquid paraffin

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Abstract

In this article, the estimation of CuO-liquid paraffin nanofluid viscosity was assessed using response surface method (RSM) and artificial neural network (ANN) methods. Since CuO-liquid paraffin nanofluid is Newtonian, two parameters of temperature and mass fraction were introduced in ANN and RSM techniques at 25–100 °C, 0.25–6 wt.%. Both methods map the three-dimensional input space to one-dimensional space (viscosity). A response surface cubic model was approved by applying ANOVA and calculations showed an R^2 value of 0.923 and a maximum margin of deviation of 10.482%. Efforts revealed that ANN with five neurons takes precedence over others. The