

عنوان مقاله:

Artificial Neural Network Approaches for Predicting the Heat Transfer in a Mini-Channel Heatsink with Alumina/Water Nanofluid

محل انتشار:

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خلاصه مقاله:

This work uses artificial neural networks to evaluate heat transfer in a mini-channel heatsink using an alumina/water nanofluid. The multi-layer perceptron (MLP) and radial basis function (RBF) neural networks are employed for the modeling. To apply the artificial neural network analysis, ۶۰ data of experimental works are utilized. The outcomes depicted that the simulated annealing (SA) technique significantly increased the performance of the RBF network, although the optimal MLP structure was discovered by trial and error. The optimized RBF network carried over more data with less than ۲% errors as compared to the MLP. While the results of the MLP network showed that the average relative error for the test data set was ۲.۰۴۹۶%, this value was ۱.۴۱۷% for the RBF network. The modeling time is a significant determining element when choosing the optimal technique. The RBF network optimization took longer than ۶۰ minutes, even though all MLP structures were run ۱۰۰ times in less than ۱۵ minutes. In summary, artificial neural networks are effective instruments for simulating these kinds of processes, and their application can save a lot of time-consuming experimentation. Additionally, the RBF network outperforms the MLP in terms of precision while requiring less processing time

کلمات کلیدی:

Artificial Neural Network (ANN), Mini-Channel Heatsink, Multilayer Perceptron, Radial basis function, Simulated Annealing

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