Scopus

Documents

Hamadneh, N., Khan, W., Tilahun, S.

Optimization of microchannel heat sinks using prey-predator algorithm and artificial neural networks
(2018) *Machines*, 6 (2), art. no. 26, . Cited 4 times.

Abstract
A rectangular microchannel heat sink is modeled by employing thermal resistance and pressure drop networks. The available correlations for both thermal resistance and pressure drop are utilized in optimization. A multi-objective optimization technique, the prey-predator algorithm, is employed with the objective to find the optimal values for the heat sink performance parameters, i.e., thermal resistance and the pumping power of the heat sink. Additionally, a radial basis function neural network is used to investigate a relationship between these parameters. Full training based on the prey-predator algorithm with the sum of the squared error function is used to achieve the best performance of the model. The analysis of variance method is also employed to test the performance of this model. This study shows that the multi-objective function based on the prey-predator algorithm and the neural networks is suitable for finding the optimal values for the microchannel heat sink parameters. The minimum values of the multi-objective function are found to be "pumping power = 2.79344" and "total thermal resistance = 0.134133". © 2019 by the authors.

2-s2.0-85054338374
Document Type: Article
Publication Stage: Final
Source: Scopus
Access Type: Open Access