

In this study, artificial neural networks (ANNs) and adaptive neuro-fuzzy (ANFIS) in order to predict the thermal performance of evacuated tube solar collector system have been used. The experimental data for the training and testing of the networks were used. The results of ANN are compared with ANFIS in which the same data sets are used. The R<sup>2</sup>-value for the thermal performance values of collector is 0.811914 which can be considered as satisfactory. The results obtained when unknown data were presented to the networks are satisfactory and indicate that the proposed method can successfully be used for the prediction of the thermal performance of evacuated tube solar collectors. In addition, new formulations obtained from ANN are presented for the calculation of the thermal performance. The advantages of this approaches compared to the conventional methods are speed, simplicity, and the capacity of the network to learn from examples. In addition, genetic algorithm (GA) was used to maximize the thermal performance of the system. The optimum working conditions of the system were determined by the GA.