"Gheorghe Asachi" Technical University of Iasi, Romania

A COMPARATIVE COMPUTATIONAL INTELLIGENCE APPROACH FOR HEAT TRANSFER ANALYSIS OF CORRUGATED PLATE HEAT EXCHANGERS

Bayram Kılıç [1*], Osman İpek[2], Arzu Şencan Şahin[3]

[1]*Mehmet Akif Ersoy University, Bucak Emin Gülmez Vocational School, Burdur, Turkey*
[2]*Süleyman Demirel University, Engineering Faculty, 32260, Isparta, Turkey*
[3]*Süleyman Demirel University, Technology Faculty, 32260, Isparta, Turkey*

Abstract

In this paper, an application artificial neural network (ANN) and adaptive neuro-fuzzy inference system (ANFIS) are presented to predict the heat transfer rate and effectiveness in the corrugated plate heat exchangers. First, the thermal performances of the corrugated plate heat exchangers were evaluated experimentally. Experimental data were used for training and testing network. The results of the ANN are compared with the ANFIS in which the same data sets are used. The ANN model is slightly better than ANFIS. The coefficient of multiple determination (R^2) values obtained when unknown data were used to the networks were 0,999636 for heat transfer rate and 0,999565 for effectiveness, which is very satisfactory. This demonstrates that the neural network presented can help the engineers and manufacturers predict the thermal characteristics of corrugated plate heat exchangers under various operating conditions.

Key words: ANFIS, ANN, corrugated plate, heat exchanger, heat transfer

---

[*] Author to whom all correspondence should be addressed: e-mail: bayramkilic@mehmetakif.edu.tr; Phone: +90 2483259900; Fax: +90 2483259900