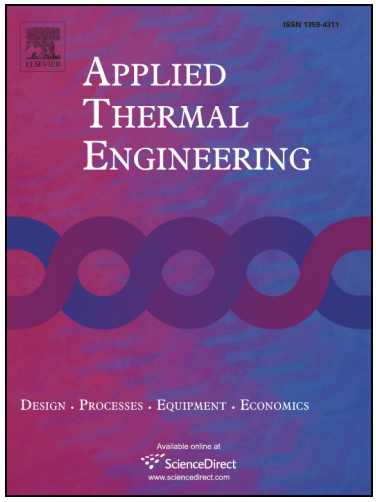

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Hasan Alimoradi, Mehrzad Shams

PII: S1359-4311(16)31798-7
DOI: http://dx.doi.org/10.1016/j.applthermaleng.2016.09.114
Reference: ATE 9139

To appear in: *Applied Thermal Engineering*

Received Date: 18 May 2016
Revised Date: 5 September 2016
Accepted Date: 20 September 2016

Please cite this article as: H. Alimoradi, M. Shams, Optimization of subcooled flow boiling in a vertical pipe by using artificial neural network and multi objective genetic algorithm, *Applied Thermal Engineering* (2016), doi: http://dx.doi.org/10.1016/j.applthermaleng.2016.09.114

Optimization of subcooled flow boiling in a vertical pipe by using artificial neural network and multi objective genetic algorithm

Hasan Alimoradi, Mehrzad Shams*

Multiphase Flow Lab, Faculty of Mechanical Engineering, K.N.Toosi University of Technology, Tehran, Iran

Abstract

A numerical scheme for optimization of surface temperature and vapor volume fraction in subcooled flow boiling is developed. The finite volume method and Euler-Euler approach were used to numerically simulate the flow field. The turbulence model of $k-\varepsilon$ is used to simulate the Reynold stresses in the averaged Navier Stokes equations. The objective functions for optimization is maximum wall surface temperature and averaged vapor volume fraction at the outlet. The variables of optimization and neural network are pressure, mass flux, inlet subcooled temperature and heat flux. Around one hundred simulations for a wide range of parameters are performed to obtain the optimum objective functions. The numerical simulation results were in good agreement with the experimental results. The results obtained from the genetic algorithm were presented in this article.

Keywords: Subcooled Boiling, Neural Network, Multi-Objective Optimization

* Corresponding author.
Email address: Shams@Kntu.ac.ir (M. Shams).
Address: No.17, Pardis St., Vanak Sq., Faculty of Mechanical Engineering, K.N.Toosi University of Technology, Tehran, Iran
Tel: +98-21-8867-7272
Fax: +98-21-8867-7273