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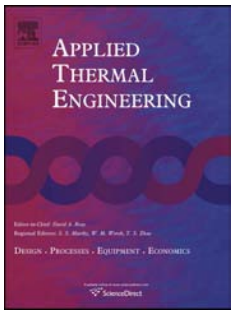

Two Objective Optimization in Shell-and-Tube Heat Exchangers Using Genetic Algorithm

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PII: S1359-4311(13)00835-1

DOI: 10.1016/j.applthermaleng.2013.11.034

Reference: ATE 5179

To appear in: *Applied Thermal Engineering*

Received Date: 18 February 2013

Accepted Date: 17 November 2013

Please cite this article as: M. Amini, M. Bazargan, Two Objective Optimization in Shell-and-Tube Heat Exchangers Using Genetic Algorithm, *Applied Thermal Engineering* (2013), doi: 10.1016/j.applthermaleng.2013.11.034.

Two Objective Optimization in Shell-and-Tube Heat Exchangers Using Genetic Algorithm

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Abstract

In this research, optimization of shell-and-tube heat exchangers is performed for two objectives. These objectives are an increment in heat transfer rate and a decrement in the total cost for a certain fluids with certain mass flow rates and specified inlet temperatures. Feasible and standard ranges for geometries, standard ranges of velocities and a maximum pressure drop constraint in both shell and tube sides are considered in the optimization process. Eleven optimization variables are considered. The relation between the objective functions and optimization variables has many complexities. A genetic algorithm is used to statistically approach the objective functions. With a genetic algorithm, the probability of getting trapped in a local optimum is very little. In this research for two sample studies, both increase in heat transfer rate and decrease in the total cost relative to available results have been obtained. The corresponding optimized values of variables for each case study have been reported. The data proposed in this study are practical suggestions for the construction of heat exchangers.

Keywords: shell-and-tube heat exchanger, two objective optimization, genetic algorithm, economic analysis