عنوان مقاله:

Pareto Optimum Design of Heat Exchangers based on the Imperialist Competitive Algorithm: A Case Study

محل انتشار:

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خلاصه مقاله:

In this paper, the multi-objective optimum design of shell and tube heat exchangers is investigated. A thermal modelling of an industrial shell and tube heat exchanger is performed using an -NTU method for estimating the shell side heat transfer coefficient and pressure drop. The efficiency and total cost (includes the capital investment for the equipment and operating cost) are two important parameters in the design of heat exchangers. The fixed parameters and the ranges of the design variables are obtained from a shell and tube recovery heat exchanger in Barez tire production factory located in Kerman city, Iran. The Imperialist Competitive Algorithm (ICA) is used to find the optimal design parameters to achieve the maximum thermal efficiency and minimum consumption cost as the objective functions. The tube inside and outside diameters, tube length and the number of tubes are considered as four design variables. Furthermore, the effects of changing the values of the design variable on the objective functions are independently investigated. At the end, the obtained Pareto front and the related design variables and their corresponding objective functions are presented.

کلمات کلیدی:

Imperialist Competitive Algorithm, Multi-Objective Optimization, Shell, Tube Heat Exchangers