

عنوان مقاله:

Estimating the unknown heat flux on the wall of a heat exchanger internal tube using inverse method

محل انتشار:

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خلاصه مقاله:

the design of heat exchangers, it is necessary to determine the heat transfer rate between hot and cold fluids in order to calculate the overall heat transfer coefficient and the heat exchanger efficiency. Heat transfer rate can be determined by inverse methods. In this study, the unknown space-time dependent heat flux imposed on the wall of a heat exchanger internal tube is estimated by applying an inverse method and simulated temperature measurements at the specified points in the flow field. It is supposed that no prior information is available on the variation of the unknown heat flux function. Variable metric method which belongs to the function estimation approach is utilized to predicate the unknown function by minimizing an objective function. Four versions of the presented inverse method, named DFP, BFGS, SR1, and Biggs, are used to solve the problem and the results obtained by each version are compared. The estimation of the heat flux depends on the location of the sensor and the uncertainties associated with temperature measurements. The influence of each factor is investigated in this paper. Results show that variable metric method is a rapid and precise technique for estimating unknown boundary conditions in inverse heat convection problems.

کلمات کلیدی:

Inverse heat transfer, Variable metric method, Heat exchanger, Unknown heat flux

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