International Energy Journal, Volume 9, Issue 3, September 2008

Pressure and Heat Transfer in Staggered Arrangement Circular Tubes with Airfoil Vortex Generator

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Abstract

In this paper the numerical solution of flow and heat transfer have been computed on staggered arrangement circular tubes and modeled by Navier-Stokes and energy equations. Two-dimensional flow, with Reynolds numbers between 100 to 500 is used. Flow is assumed to be incompressible, steady state and the thermo physical characteristics are constant. The elliptic differential equations are used to generate orthogonal grid and finite volume equations are solved to link pressure and velocity terms. Nusselt numbers, pressure changes, velocity and friction coefficients have been obtained in two conditions of with and without obstacle, and compared. The results show that the usage of airfoil obstacle is efficient for increasing heat transfer in spite of more friction coefficient and more pressure reduction.