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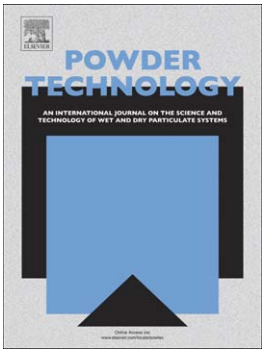

Numerical investigation of turbulent forced convection flow of nano fluid in curved and helical pipe using four-equation model

Ali Safari, Majid Saffar-Avval, Ehsan Amani

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Numerical investigation of Turbulent forced convection flow of nano fluid in curved and helical pipe using four-equation model

Ali Safari, Majid Saffar-Avval*, Ehsan Amani.

Mechanical Engineering Department, Amirkabir University of Technology, 424 Hafez Ave, Tehran 15875-4413, Iran

* Corresponding author. Fax: +98 2166419736. E-mail address: mavval@aut.ac.ir (M. Saffar-Avval).

Abstract:

Using nano fluid and curved pipes are two efficient methods for improving heat transfer rate. In the present research, turbulent flow in curved tube and helically coiled tubes is numerically investigated in developing flow. In addition, convective heat transfer is investigated in helically coils under constant wall heat flux. Heat transfer in Nano fluids is solved using homogeneous model or two-phase model. In the present study, the four-equation model is applied, considering slip mechanisms between two phases. This model is simplified in comparison with two-phase model; it can be used as an efficient model for numerical solution of nanofluid heat transfer. Governing equations are solved in OpenFOAM. Three turbulent models, komegaSST, SAS and LES are used. The results illustrate a better agreement of these models with experimental data, in comparison with homogeneous model.

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