عنوان مقاله:

MODELING AND SIMULATION OF NATURAL CONVECTION HEAT TRANSFER PROCESS IN POROUS AND NON-POROUS MEDIA

محل انتشار:

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خلاصه مقاله:

This work presents a 2-D numerical solution in order to investigate thenatural convection heat transfer in porous and non-porous media. In thispaper, water was used as a fluid passes through the porous and non-porousmedia. The magnitude of fluid flow rate, fluid temperature gradient in theboundary area and pressure changes in porous and non-porous media weresimulated and were validated with literature data. In this article, meshingwas done in order to increase the accuracy and decrease the computationalerror. In the modeling, it was assumed that the fluid around the boundariesof porous and non-porous media is stagnant. According to modeling andsimulation, use of porous media has caused the significant increase ofvelocity (3.810-8 cm/s in non-porous media and 5.0810-5 cm/s in porousmedia). Also the use of porous media caused increase of convective heattransfer 1.7 times more than non-porous media. There was a very goodagreement between simulation results and literature data with ARE(Average Rate of Error) maximum 10.2%.

کلمات کلیدی:

Porous media, free convection, heat transfer flux, simulation