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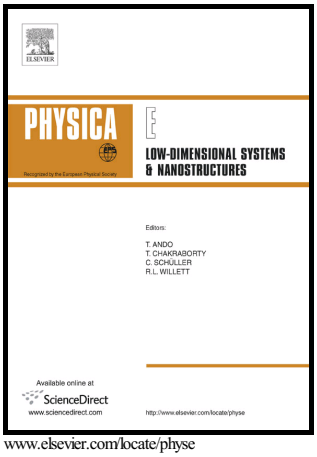

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The Effect of velocity and dimension of solid nanoparticles on heat transfer in non-Newtonian nanofluid

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Abstract

In this investigation, the behavior of non-Newtonian nanofluid hydrodynamic and heat transfer, are simulated.In this study, we numerically simulated a laminar forced non-Newtonian nanofluid flow, Contains a 0.5 Wt%,Carboxy methyl cellulose (CMC) Solutionin Water as the base fluid with Alumina at volume fractions of 0.5 and 1.5 as the solid nanoparticle.Numerical solution was modelled in cartesiancoordinate system in a two-dimensional microchannel in Reynolds number range of $10 \leq Re \leq 1000$. The analyzed geometrical space here was a rectangular part of whose upper and bottom walls was influenced by a constant temperature. The effect of volume fraction of the nanoparticles, Reynolds number and non-Newtonian nanofluids was studied.In this research, the changes pressure drop, the Nusselt number, dimensionless temperature and heat transfer coefficient, caused by the motion of non-Newtonian nanofluidsare described.The results indicated that the increase of the volume fraction of the solid nanoparticles and a reduction in the diameter of the nanoparticles would improve heat transfer which is more significant in Reynolds number.The results of the introduced parameters in the form of graphs drawing and for different parameters are compared.

Keywords:Numerical simulation, nanofluid, Carboxy methyl cellulose, Microchannel

1. Introduction

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