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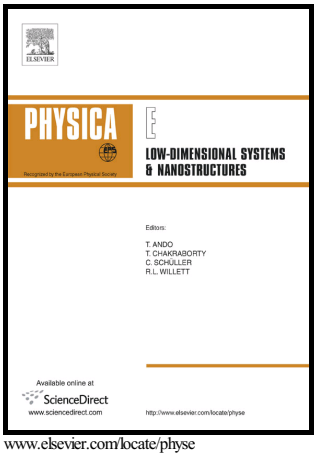

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The numerical investigation of heat transfer and pressure drop of turbulent flow in a triangular microchannel

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Abstract

In this presentation, the flow and heat transfer inside a microchannel with a triangular section, have been numerically simulated. In this three-dimensional simulation, the flow has been considered turbulent. In order to increase the heat transfer of the channel walls, the semi-truncated and semi-attached ribs have been placed inside the channel and the effect of forms and numbers of ribs has been studied. In this research, the base fluid is Water and the effect of volume fraction of Al_2O_3 nanoparticles on the amount of heat transfer and physics of flow have been investigated. The presented results are including of the distribution of Nusselt number in the channel, friction coefficient and Performance Evaluation Criterion of each different arrangement. The results indicate that, the ribs affect the physics of flow and their influence is absolutely related to Reynolds number of flow. Also, the investigation of the used semi-truncated and semi-attached ribs in Reynolds number indicates that, although heat transfer increases, but more pressure drop arises. Therefore, in this method, in order to improve the heat transfer from the walls of microchannel on the constant heat flux, using the pump is demanded.

Keywords: computational fluid dynamics, microchannel, Nusselt number, nanoparticle.