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Izadi, M., Mohebbi, R., Chamkha, A., Pop, I.

Effects of cavity and heat source aspect ratios on natural convection of a nanofluid in a C-shaped cavity using Lattice Boltzmann method
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Abstract
Purpose: The purpose of this paper is to consider natural convection of a nanofluid inside of a C-shaped cavity using Lattice Boltzmann method (LBM). Design/methodology/approach: Effects of some geometry and flow parameters consisting of the aspect ratio of the cavity, aspect ratio of the heat source; Rayleigh number (Ra = 103 − 106) have been investigated. The validity of the method is checked by comparing the present results with ones from the previously published work. Findings: The results demonstrate that for Ra = 103, the aspect ratio of the heat source has more influence on the average Nusselt number in contrast to the case of Ra = 106. Contrary to the fact that the average Nusselt number increases non-linearly more than twice because of the increase of the aspect ratio of the enclosure at Ra = 103, the average Nusselt number has a linear relation with the aspect ratio for of Ra = 106. Therefore, upon increasing the Rayleigh number, the efficiency of the aspect ratio of the cavity on the thermal convection, gradually diminishes. Originality/value: The authors believe that all the results, both numerical and asymptotic, are original and have not been published elsewhere. © 2018, Emerald Publishing Limited.

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