

عنوان مقاله:

Mesoscopic Simulation of Forced Convective Heat Transfer of Carreau-Yasuda Fluid Flow over an Inclined Square:
Temperature-dependent Viscosity

محل انتشار:

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نویسندگان:

Ali Jalali - *Department of Mechanical Engineering, Payame Noor University (PNU), P.O. BOX ۱۹۳۹۵-۳۶۹۷, Tehran, Iran*

Amin Amiri Delouei - *Department of Mechanical Engineering, University of Bojnord, Bojnord, Iran*

Mojtaba Khorashadizadeh - *Department of Mechanical Engineering, Payam Noor University, Mashhad, Iran*

A.M. Golmohamadi - *Department of Mechanical Engineering, Payam Noor University, Mashhad, Iran*

خلاصه مقاله:

In the current study, non-Newtonian flow pattern and heat transfer in an enclosure containing a tilted square are examined. In order to numerically simulate the problem, the mesoscopic lattice Boltzmann method is utilized. The non-Newtonian Carreau-Yasuda model is employed. It is able to adequately handle the shear-thinning case. The simulation results of flow and heat transfer have been successfully verified with the previous studies. Several parameters such as Nusselt number, Drag coefficient, and Carreau number are investigated in details. Considering the temperature-dependent viscosity, it is seen that with increasing the temperature-thinning index, the drag coefficient increases, but the Nusselt number decreases. By rotating the square obstacle, the results display that increasing the angle of inclination from zero to 45 degrees, increases both the drag coefficient and the Nusselt number. Also, the highest rate of heat transfer occur at the angle of 45 degrees (diamond); however it has a negative impact on the Drag coefficient.

کلمات کلیدی:

Carreau-Yasuda model, Temperature-dependent viscosity, Inclined square, Lattice Boltzmann method

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