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**Effects of Nonuniform Heating and Wall Conduction on Natural Convection in a Square Porous Cavity Using LTNE Model**
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**Abstract**
The effects of nonuniform heating and a finite wall thickness on natural convection in a square porous cavity based on the local thermal nonequilibrium (LTNE) model are studied numerically using the finite difference method (FDM). The finite-thickness horizontal wall of the cavity is heated either uniformly or nonuniformly, and the vertical walls are maintained at constant cold temperatures. The top horizontal insulated wall allows no heat transfer to the surrounding. The Darcy law is used along with the Boussinesq approximation for the flow. The results of this study are obtained for various parametric values of the Rayleigh number, thermal conductivity ratio, ratio of the wall thickness to its height, and the modified conductivity ratio. Comparisons with previously published work verify good agreement with the proposed method. The effects of the various parameters on the streamlines, isotherms, and the weighted-average heat transfer are shown graphically. It is shown that a thicker bottom solid wall clearly inhibits the temperature gradient which then leads to the thermal equilibrium case. Further, the overall heat transfer is highly affected by the presence of the solid wall. The results have possible applications in the heat-storage fluid-saturated porous systems and the applications of the high power heat transfer. Copyright © 2017 by ASME.

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