Conjugate Free Convection in a Square Cavity Filled with Nanofluid and Heated from Below by Spatial Wall Temperature

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Abstract : The problem of conjugate free convection in a square cavity filled with nanofluid and heated from below by spatial wall temperature is studied numerically using the finite difference method. Water-based nanofluid with copper nanoparticles are chosen for the investigation. Governing equations are solved over a wide range of nanoparticle volume fraction ($0 \le \phi \le 0.2$), wave number (($0 \le \lambda \le 4$) and thermal conductivity ratio ($0.44 \le Kr \le 6$). The results presented for values of the governing parameters in terms of streamlines, isotherms and average Nusselt number. It is found that the flow behavior and the heat distribution are clearly enhanced with the increment of the non-uniform heating.

Keywords : conjugate free convection, square cavity, nanofluid, spatial temperature
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