

Lattice Boltzmann equation for natural convection in a two dimensional cavity with a partially heated wall

April 15, 2004

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Abstract

We present numerical results, using the lattice Boltzmann equation method, of natural convection in a two dimensional cavity where one of the vertical walls is divided into two parts, the lower one is conductive, the upper part and all the other walls being adiabatic. These results compare favourably with experiments of plume formation using the schlieren technique in the laminar and transition regimes. We made numerical experiments ranging from $Ra = 10^6$ to $Ra = 10^9$. The detachment and growth of the starting wall plume were studied by measuring the vertical growth of its topmost position, the displacement of the thermal center and the thickening of the thermal boundary layer at a specific location.