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Convective heat transfer by oscillating flow in an enclosure with non-uniform spatial bottom wall temperature profile SAEID RAHEIMPOUR ANGENEH, MURAT KADRI AKTAS, TOBB University of Economics and Technology — Effects of the acoustic streaming motion on convective heat transfer in a rectangular shallow enclosure with sinusoidal spatial bottom wall temperature distribution are investigated numerically. Acoustic excitation is generated by the periodic vibration of left wall. The top wall of the enclosure is isothermal while the side walls are adiabatic. A FORTRAN code is developed to predict the oscillatory and mean flow fields by considering the compressible form of the Navier -Stokes equation and solved by flux-corrected transport algorithm. In order to validate the results of the simulations, a case with an unheated bottom wall is considered and compared with the existing literature. Applying the sinusoidal temperature profile to the bottom wall provides axial and transverse temperature gradients. In return these gradients strongly affect the flow pattern in the enclosure. Heat transfer depends on the flow structure considerably. This is the first time that the effect of nonzero mean vibrational flow on thermal convection from a surface with sinusoidal temperature profile investigated. Results of this study may lead up to design of new heat removal applications.

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