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Heat and fluid flow in a modified Rayleigh-Benard cavity with an inverted-V upper plate ANTONIO CAMPO, Mechanical Engineering, The University of Vermont, Burlington, VT 05405, HASSAN RIDOUANE, Mechanical Engineering, The University of Vermont, Burlington, VT 05405, USA, JANE CHANG, Department of Applied Statistics and Operations Research, Bowling Green State University, Bowling Green, OH 43403, USA — The heat and fluid flow characteristics of air inside a modified Rayleigh-Benard (RB) cavity with a lower flat plate and an inverted-V upper plate has been investigated numerically using the finite-volume method. The problem is controlled by two parameters: (1) the Rayleigh number Ra and (2) the relative height of the vertical sidewalls d. The numerical velocity and temperature fields are presented in terms of streamlines, isotherms, local and mean heat fluxes. The critical Ra values descriptive of the transition from symmetrical to asymmetrical buoyant airflow due to incremental changes in Ra were determined. A general correlation equation for the Nusselt number in terms of Ra and the dimensionless d was developed using nonlinear multiple regression theory.

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