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3D chaotic mixing promoted with time-dependent natural convection LUIS M. DE LA CRUZ, DGSCA, UNAM, EDUARDO RAMOS, CIE, UNAM — Mixing with natural convection inside a three-dimensional cubic cavity can be achieved if the motion of a fluid is generated by imposing alternating hot and cold temperatures on opposite walls. In this work we study the flow produced inside a cubic prism with sections of its upper and lower horizontal walls cooled and heated in a periodic manner. These boundary conditions generate a vortex of time dependent intensity which moves around the geometrical center of the cavity. The three-dimensional trajectory followed by the vortex and its intensity are described. The governing equations of natural convection are solved numerically using the control volume method and equations are decoupled following the SIMPLEC (Semi-Implicit Method for Pressure Linked Equations) integration strategy. The mixing properties of the flow are described by Lagrangian tracking of collections of massless points. It is demonstrated that efficient mixing can be achieved with natural covection.

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