Natural convection in a cylindrical cavity JOSE NUNEZ, MIGUEL LOPEZ, EDUARDO RAMOS, GUILLERMO HERNANDEZ, SERGIO CUEVAS, Center for Energy Research UNAM, MINERVA VARGAS, Instituto Tecnologico de Zacatepec — Natural convection in a vertical cylinder heated from below is studied experimentally and numerically. The aspect ratio (diameter/height) is 1.3 and we observe convective motions for a Prandtl number of 6.66 and a range of Rayleigh numbers from 1.0×10^5 to 5.0×10^6. This range of Rayleigh numbers includes steady and time-dependent flows. Experimental observations were made with a composed PIV system capable of simultaneously obtaining velocity distributions in two mutually perpendicular planes. The numerical model comprises the solution of the three-dimensional time-dependent Boussinesq equations in cylindrical coordinates. In all cases analyzed, the flows present complex three-dimensional structures and we use the *vortex core* concept as a visualization technique to characterize the fluid motion. Experimental observations are compared with theoretical calculations and quantitative agreement is obtained for steady flow and averaged values in unsteady flow.

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