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**Thermal convection in a rotating liquid sphere with radial gravity as a direct function of the radius.** VICTOR HUITRON, RUBEN AVILA, Facultad de Ingeniera, Universidad Nacional Autnoma de Mxico, Mexico City, Mexico — The thermal convection of the terrestrial planets without solid inner core, has been subject of research in the last decades. Some theories claim that at the beginning of the formation of the planets, the solid inner core was absent. This research is aimed to analyze the convective patterns and the heat transfer rate in a rotating liquid sphere by solving the non-steady, three-dimensional Navier-Stokes equations. In order to avoid the singularity at the center of the sphere, the set of equations for an incompressible fluid are formulated in a Cartesian coordinate system and solved by using the mesh-based h/p Spectral Element method. The thermal convection is driven by both a uniform internal energy source and a radial gravitation field that is directly proportional to the radius of the sphere. The effect of increasing the value of the Rayleigh Ra number and the Taylor Ta number, on the convective patterns and on the velocity, temperature and vorticity fields is presented. The local and average Nusselt numbers at the surface of the whole sphere are evaluated together with the temperature, vorticity and pressure fields. The obtained results are successfully compared with numerical solutions previously published in the literature.

Victor Huitron
None

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