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Thermal convection in a rotating fluid sphere with self gravity, uniform heat source and precession[1] RUBEN AVILA, Universidad Nacional Autonoma de Mexico — The natural convection of a rotating fluid sphere with a self gravity field (which is proportional to the radius of the sphere) and with precessional motion is presented. The spherical bounding surface is maintained at a constant and uniform temperature which is lower than the temperature of the fluid. A constant and uniform heat source increases the temperature of the fluid confined in the sphere. The fluid sphere rotates and precesses with angular velocity vectors that form a certain inclination angle between them. The governing non-steady, three dimensional Navier-Stokes equations for an incompressible fluid, formulated in a Cartesian coordinate system (in the mantle reference frame) are solved by using the spectral element method. The influence of the Rayleigh number, the Ekman number and the Poincare number on the flow patterns, the temperature field and the heat transfer rate from the fluid sphere is presented.

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