

Investigation of Conservation of Angular Momentum in Parallel FEM Simulations for Thermal Convection in a Rotating Spherical Shell

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We investigate the conservation of angular momentum for simulations of thermal convection in a rotating system by GeoFEM, which gives a parallel FEM platform. In this study, we consider a Boussinesq fluid in a spherical shell modeled on the Earth's outer core and in a model of plane cavity with a constant gravity which has z direction. The results for the plane cavity model show that the z-component of the angular momentum is almost satisfied the conservation law although it varies in time. On the other hand, two types of errors are seen in the case of the spherical shell model. One is caused by resolutions and the Taylor number, and another is caused by the application method of the boundary condition for the fluid.