

# A numerical method for geodynamo simulations based on Fourier expansion and finite difference: its parallel execution performance

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Most of numerical simulations of the geodynamo are based on a spectral transform method (STM) in which variables are expanded by spherical harmonics. This method has advantages in accuracy, but has a disadvantage in the amount of computations. Because of this disadvantage, it is difficult to be applied for high-resolution simulations. Here we developed a new method based on one-dimensional Fourier expansion in longitude. The spectral equations are solved in a meridional plane by using a finite difference method. This method is better than STM in the amount of computations. The accuracy of this method was examined by comparing with STM, and it was consequently found that the method could simulate a self-exciting Earth-type dynamo with an acceptable accuracy. The result of this examination was shown at the last SGEPPS fall meeting. In this presentation the calculation performance of this method on the Earth simulator will be shown and the effectivity of the method will be discussed.