# Analysis of magnetic secular acceleration in a numerical dynamo model

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Geomagnetic jerk is known as a sudden change in the trend of geomagnetic secular variation, which typically occurs in annual timescale. Wavelet analysis is a useful tool to detect singular variation in time-series data. Alexandrescu et al. (1995) applied wavelet analysis to geomagnetic field data obtained at ground observatories in Europe. They detected geomagnetic jerks in 1901, 1913, 1925, 1969 and 1978, and showed that regularity of the magnetic field variation is about 1.5 rather than 2.

We have studied magnetic field variation in numerical dynamo models using wavelet analysis to see if any jerk-like event occurs. In spite of the fact that magnetic field variation in dynamo models occurs more slowly compared with the geomagnetic secular variation due to assumed values of the fluid viscosity very far from that in the Earth's core, we have found jerk-like magnetic field variation with respect to all of the three components in a numerical dynamo model. Regularity of such variations is typically larger than 2, suggesting a less singular variation than the geomagnetic jerk. It is also noted that jerk-like variation occurs both globally and locally. We then examine the magnetic field variation in a numerical dynamo model in terms of secular acceleration, that is, second time derivative of the magnetic field. In this study, correspondence of the results from two different analyses is to be compared. We will discuss similarity and dissimilarity in characteristics of magnetic field variation obtained from wavelet analysis and secular acceleration.