

RIKITAKE

Rikitake is a python program that integrates the Rikitake dynamo differential equation system and calculates the Lyapunov exponents of the system using the obtained solution.

The Rikitake dynamo

The Rikitake dynamo is a model that describes the geodynamo, that is the mechanism that generate the Earth's magnetic field. The first description has been made by Rikitake (1973). These equations depend on four variables X_1 , X_2 , Y_1 , Y_2 and on two parameters μ and k . More informations can be found in (D. L. Turcotte, Fractals and chaos in geophysics, 1992, Cambridge University press). It is a system of four non-linear coupled differential equations that may show chaotic behaviour. A measure of the chaoticity of a system is given by the Lyapunov exponents (see, as example, the relative page in Scholarpedia).