CONTROL THE CHAOTIC RIKITAKE SYSTEM BY PID CONTROLLER

MOJTABA CHAVOOSHI ZADE

Department of Electrical Engineering, Dariun Branch, Islamic Azad University, Dariun, Iran

ABSTRACT

In this paper a PID controller for the Chaos Rikitake system is introduced. The mathematical model of the Rikitake system consists of three nonlinear differential equations, which are found to be the same as the mathematical model of the well known Lorenz system. The study showed that the system is experiencing a chaotic behavior at certain value of the control parameter. The experienced chaotic oscillations may simulate the reversal of the Earth's magnetic field. The Proportional - Integral - Derivative (PID) controller is one of the most popular controllers used in industry because of their remarkable effectiveness, simplicity of implementation and broad applicability. In this paper the behavior of chaotic Rikitake system is investigated, after that a PID controller is implemented to achieve the stability of system. Simulation results illustrate the effectiveness and validity of the proposed approach.

KEYWORDS: Chaos, Rikitake System, Sinusoid, Stability, PID Controller