



ChemTech

## International Journal of ChemTech Research

CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555  
Vol.9, No.05 pp 462-469, 2016

# Global Chaos Regulation of a Symmetric Nonlinear Gyro System via Integral Sliding Mode Control

Sundarapandian Vaidyanathan\*

R & D Centre, Vel Tech University, Avadi, Chennai, Tamil Nadu, India

**Abstract :** Chaos theory has a lot of applications in science and engineering. Gyros are an important class of nonlinear control systems and they have attributes of great utility to navigational, aeronautical and space engineering. In this research work, we first describe the dynamics of a symmetric nonlinear gyro system with linear and cubic damping discovered by Chen (2002). Chen's gyro system is a two-dimensional, non-autonomous, chaotic system and it has important applications. Next, new results are obtained for the global chaos regulation of the Chen's gyro system. MATLAB plots have been shown to illustrate the phase portraits of Chen's gyro system and the global chaos regulation of Chen's gyro system via integral sliding mode control.

**Keywords:** Chaos, chaotic systems, gyro system, symmetrical system, gyroscope, navigational engineering, aeronautical engineering, sliding mode control, chaos regulation, chaos control, stability.

Sundarapandian Vaidyanathan /International Journal of ChemTech Research, 2016,9(5),pp 462-469.

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