Adaptive Control of Nonlinear in Parameters Chaotic Systems

S.M. Ayati* and A. Khaki-Sedigh

Department of Electrical Engineering, K.N. Toosi University of Technology,
Sayyed Khandan Bridge, Shariati Street, Tehran, Iran

Abstract: This paper presents the adaptive control of chaotic systems, which are nonlinear in parameters (NLP). A method based on Lagrangian of an objective functional is used to identify the parameters of the system. Also this method is improved to result in better rate of convergence of the estimated parameters. Estimation results are used to calculate the Lyapunov exponents adaptively. Finally, the Lyapunov exponents placement method is used to assign the desired Lyapunov exponents of the closed loop system. Simulation results are provided to show the effectiveness of the results.

Keywords: *Chaotic system; nonlinear in parameter system identification; Lyapunov exponents placement; gradient method.*

Mathematics Subject Classification (2000): 93C10, 93C40, 34C28.