Nonlinear Control Theory

Chair: Oh Jun-Ho (KAIST)
Co-Chair: Lim Myo-Taeg (Korea Univ.)

09:00-09:20
On Stability of Discrete Time Nonlinear Systems with Slow-in-the-average Time Varying Inputs
Y. S. Shin, J. T. Lim (KAIST)

In this paper we show the stability analysis of the discrete nonlinear system with average bounded variation of the input. This is the discrete counterpart of that continuous one. We use the Lyapunov stability to prove the boundedness of the steady-state error. Also the allowable maximum variation bounds and the region of attraction are given as the function of the system parameters. Moreover, we prove the uniform convergence for the constant input.

09:40-10:00
Dynamic Feedback Linearization of Nonlinear Discrete-Time Systems with 2 Inputs
Cho Hyung-Joon, Ryu Dong-Young, Park Se-Yeon Lee Hong-Gi (Chung-Ang Univ.) and Kim Yong-Min (Choongchung Univ.)

In this paper, we find the necessary and sufficient conditions of linearization of nonlinear discrete-time systems with 2 inputs using the restricted class of dynamic feedback. That is, this paper is the discrete version of [2]. The results we obtain for discrete-time nonlinear systems are, however, quite different from that of continuous-time case.

10:20-10:40
Target Motion Analysis for Active/Passive Mixed-Mode Sonar Systems
Lim Young Taek and Song Taek Lyul (Hanyang University)

Target Motion Analysis (TMA) for Passive Sonar Systems with bearing-only measurements needs to enhance system observability to improve target tracking performance by ownership maneuvering. However, tracking problem incurred by weak observability result in slow convergence of the target estimates. On the other hand, active sonar systems do not have problem associated with system observability. However, it draws back related to system survivability. In this paper, the algorithm that could be used in Active/Passive Mixed-Mode Sonar Systems is proposed to analyze maneuvering target motion and to improve TMA performance. The proposed TMA algorithm is tested by a series of computer simulation runs and the results...

10:40-11:00
Fuzzy System and Knowledge Information for Stock-Index Prediction
Kim Hae-Gyun, Bae Hyeon and Kim Sung-Shin (Pusan National University)

In recent years, many attempts have been made to predict the behavior of bonds, currencies, stock, or other economic markets. Most previous experiments used multilayer perceptrons (MLP) for stock market forecasting. The Kosp 200 Index is modeled using different neural networks and fuzzy system predictions. In this paper, a multilayer perceptron architecture, a dynamic polynomial neural network (DPNN) and a fuzzy system are used to predict the Kosp 200 index. The results of prediction is compared with the root mean squared error (RMSE) and the scatter plot. The results show that the fuzzy system is performing slightly better than DPNN and MLP. We can develop the desired fuzzy system by learning methods...