D-TA05 Control Theory 1

08:30-10:30 **Chair : Oh Sung-Bo (Cheju National Univ.)**
Room : 4134 **Co-Chair : Lee Jietae (Kyungpook National Univ.)**

08:30 – 08:50 **D-TA05-1**

Covariance Controller Design for Linear SISO Systems

Kim Hochan, Oh Seongbo(Cheju National Univ.)
Ko Bongwoon(Cheju College of Technology)

In this paper, an alternate method for state-covariance assignment for SISO(single input single output) linear systems is proposed. This method is based on the inverse solution of the Lyapunov matrix equation and the resulting formulas are similar in structure to the formulas for pole placement. Further, the set of all assignable covariance matrices to a SISO linear system is also characterized..

08:50 – 09:10 **D-TA05-2**

Payload-Swing Suppression of a Container Crane: Comparison Between Command Shaping Control and Optimal Control

Huh Chang-Do and Hong Keum-Shik
(Pusan National Univ.)

In this paper two control strategies, command shaping control and optimal control, which aim to the reduction of the residual vibrations of the payload in a container crane system are investigated. Both control methods are open loop control. Due to unmodeled dynamics of the plant and disturbances like initial sway and wind, some residual sway always exists at the end of trolley movement. Command inputs are designed to achieve the control objectives including minimal residual vibration and robustness in the presence of unmodeled dynamics. Simulation results of various command inputs are compared in terms of arrival time, residual sway angle, robustness, and maximum sway distance during the traveling. Command shaping method provides a more competent tool than optimal control.

09:10 – 09:30 **D-TA05-3**

Controller Design of the 2nd-order System Based on Phase Margin Specifications

Lee Bohyung
(LG Electronics)

This paper presents a controller design technique for standard 2nd-order system satisfying user-specified phase margin. A simple method is presented to meet stabilty margin for the 2nd-order system, which is important since the 2nd-order plant models are frequently encountered in the practical plant models such as actuators of the optical drive systems. Through the comparision of the specified stabilty margin and achieved stability margin, it is shown in the simple example that the proposed technique is useful in the initial design of control systems with stability margin specifications.

09:30 – 09:50 **D-TA05-4**

Adaptive Control with Antiwindup Scheme for Relaxed Static Stability(RSS) Missiles with Saturating Actuator

Kim Young Hwan, Chwa Dong Kyung, Im Ki Hong and Choi Jin Young
(Seoul National Univ.)

This paper proposes an adaptive control scheme for an autopilot design of Relaxed-Static-Stability(RSS) Missiles with saturating actuator. The feedback linearization contrdler eliminates nonlinear terms in RSS missile dynamics and makes the entire system linear. But modeling errors, disturbances and the nonlinear mismatch due to input constraints exert a bad influence on the performance of the feedback linearization controller. Thus, first, we derive a parametric affine uncertainty model with modeling errors and disturbances. Then an adaptive control law with anti-windup scheme is developed, where the bounds of uncertainties are estimated with adaptive laws. The proposed adaptive controller can remove the bad effects of uncertainties, of disturbances, and of saturating actuator...