I-TMP01 International Poster Session

13:00 – 13:50 **Chair : Park Sun Won (KAIST)**
Room : Terrace(3F) **Co-Chair : E-Sok Kang (Chungnam National Univ.)**

13:00 – 13:50 **I-TMP-7**

Vibration Control of an Axially Moving Belt by a Nonlinear Boundary Control

Ji-Yun Choi and Keum-Shik Hong
(Pusan National Univ.)

In this paper, the vibration suppression problem of an axially moving power transmission belt is investigated. The equations of motion of the moving belt is first derived by using Hamilton's principle for systems with changing mass. The total mechanical energy of the belt system is considered as a Lyapunov function candidate. Using the Lyapunov second method, a nonlinear boundary control law that guarantees the uniform asymptotic stability is derived. The control performance with the proposed control law is simulated. It is shown that a boundary control can still achieve the uniform stabilization for belt systems.

13:00 – 13:50 **I-TMP-8**

Application of the Robust Control Theory to the Dynamic Voltage Restorer

Y. Chun, J. Kim, J. Jeon
(KERI)

Recent trend of increasing automated factories needs supply of high quality power from the utilities. Among the items of the power quality, voltage sag can be compensated by Dynamic Voltage Restorer(DVR). The key feature of the DVR is high response with less transient period to recover from the voltage sag due to the lightning or line-to-ground faults. In this paper we report that H controller is very promising for the pr actical application to the controller of DVR. Experiment al results shown in this paper was obtained by applying the control algorithm to 20 kVA DVR system. T he experimental set consist s of IGBT - based three phase inverter and the TMS320C32- 60 DSP used for main processor of the control board. T∞ simulate the 50% voltage ...

13:00 – 13:50 **I-TMP-9**

A Study on the Autonomous Navigation of Rovers for Mars Surface Exploration

Han-Dol Kim, Byung-Kyo Kim
(KARI)

In the planetary surface exploration, micro-rovers or nano-rovers are very attractive choices for a surface exploration system providing mobility functions and other features required in the surface probe missions at small mass and relatively small cost. This paper surveys and summarizes the requirements for Mars exploration rovers in micro or nano scale and outlines the control concepts for navigation including the obstacle/hazard avoidance and the path planning. In this context, autonomous reaction capabilities are the key elements to control design in conjunction with the remote control schemes to deal with the significant signal propagation delays. Other navigation and control aspects such as the instrument fine positioning and the flip-over of the rovers are also briefly introduced. The current technical limitations of the micro- and nano-rovers are summarized.

13:00 – 13:50 **I-TMP-10**

A Study on the Optimal Model Following Sliding Mode Control

Min-Chan Kim, Seung-Kyu Park
(Chang-Won Univ.)

In this paper, a novel model following sliding mode control is proposed by using a novel sliding mode with virtual state. This sliding surface has nominal dynamics of an original system and makes it possible that the Sliding Mode Control(SMC) technique is combined with the optimal controller. Its design is based on the augument system whose dynamics have one higher order than that of the original system. The reaching phase is eliminated by using an initial virtual state that makes the initial sliding function equal to zero.

13:00 – 13:50 **I-TMP-11**

Design of Optimal Sampled-Data Controller for Continuous-Time Chatoic Systems

Kwang Sung Park, Jin Bae Park(Yonsei Univ.)
and Yoon Ho Choi (Kyonggi Univ)

In this paper, we propose new digital optimal control approach for controlling continuous-time nonlinear chaotic systems, which show very complex behavior and cannot be easily controlled by conventional control methods. Most real systems are represented as continuous-time system, whereas some control methods should be implemented under the condition of computer-based platforms, which are discrete-time systems. To achieve the control objective for chaotic systems successfully, the sampled-data controller, which considers the inter-sample behavior of the continuous-time systems effectively, should be needed. The proposed optimal controller is designed based on the linearized estimation model of chaotic systems. By the computer simulation, we show the control ...

13:00 – 13:50 **I-TMP-12**

Steady State Optimal Control of Discrete Weakly Coupled Bilinear Systems

Hyun-Goo Kang, Beom-Soo Kim, Myo-Taeg Lim
(Korea Univ.)

This paper presents a steady state optimal control algorithm for the weakly coupled discrete time bilinear systems. The optimal solution for the overall system is obtained by solving a sequence of reduced order algebraic Riccati equations with an arbitrary accuracy. The obtained solutions converge to the optimal solutions by using the iteration method. We verify the proposed method by applying it to a real world numerical example.