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-1**

Implement High Speed Bidirectional pulse power supply(BPPS) for plating

Tae-Eon Kim, Jong-Oh Park, Yong-Seong Cho, Ihn-Yong Lee, Young-Han Kim, Young-Do Lim (Dong-A Univ.)

Electric plating is used in various industry field. Specially, pulse plating is able to deposit material at high current density compared to conventional DC plating. For example, pulse plating can get more fine grain, can improve adhesion and metal distribution and current efficiency, can reduce internal stress and crack. Therefore, we developed bidirection pulse power supply(BPPS) which has high speed pulse current and high current density and improve deposition quality and increase plating speed in this paper. BPPS(Bidirection pulse power supply) needs high speed rising time, falling time and output current accuracy. BPPS consists of rectifier part, chopper part, invertor part, and control part. Rectifier part changes outprt current direction. Control part has microprocessor.

13:00 – 13:50 **I-TMP-2**

Robust Adaptive Control of Nonlinear Output Feedback Systems under Disturbance with Unknown Bounds

Y. H. Hwang, H. W. Yang (Hanyang Univ.), D. H. Kim(Duke Univ.), D. W. Kim(Daeduk College), E, S. Kim(Halla Univ.)

This paper addresses the robust adaptive output feedback tracking for nonlinear systems under disturbances whose bounds are unknown. A new algorithm is proposed for estimation of unknown bounds and adaptive control of the uncertain nonlinear systems. The State estimation is solved using K-filters, together with the construction of a bound of an error in the state estimation due to the perturbation of the disturbance. Tuning functions are used to estimate unknown system parameters withort overparametrization. The proposed control algorithm ensures that the out put tracking error conve-rges to a residual set which can be arbitrarily small, while maintaining the boundedness of all other variables. A simulati-on shows the effectivness of the proposed approach.

13:00 – 13:50 **I-TMP-3**

The conceptual design of the x y Θ fine stage and its optimal design to obtain fast response in lithography system.

Kim Dong-Min, Kim. Ki-hyun, Sung-Q. Lee and Gweon Dae-Gab (KAIST)

The quality of a precision product, in genera, relies on the accuracy and precision of its manufacturing and inspection process. In many cases, the level of precision in the manufacturing and inspection system is also dependent on the positioning capability of tool with respect to the workpiece in the process. Recently the positioning accuracy level employed for some of precision product has reached the level of submicron and long range of motion is required. For example, for 1GDRM lithography, 20nm accuracy and 300nm stroke needs. This paper refers to the lithography stage especially fine stage. In this study, for long stroke and high accuracy, the dual servo system is proposed. For the coarse actuator, LDM(Linear DC Moter) is used and for fine on VCM is used...

13:00 – 13:50 **I-TMP-4**

A Vibration-Rejection Control for a Magnetic Suspension System

Jong-moon Kim, Choon-kyung Kim, Min-kook Park, and Seog-joo Kim (KERI.)

This paper presents a vibration-rejection control design for a magnetic suspension system which has strong non-linearity, open-loop unstable characteristics, high-order flexible modes, and parameter variations. The target plant to be controlled consists of a U-core electromagnet and a flexible rail. We describe the test rig and formulate the mathematical model and then we set up a control problem as the mixed sensitivity problem where the augmented plant is constructed with frequency weighting functions and the feedback controller is designed by using the H∞ controller. The effectiveness of the designed controller for the magnetic suspension system with high-order flexible modes is validated and justified using several simulations. These results show that the magnetic suspension system is robustly stable against disturbance and gives the well-damped tracking performance ...

13:00 – 13:50 **I-TMP-5**

Backstepping Control of Robot Manipulators Driven by Induction Motors Using Neural Networks

Jung-Wook Kim, Dong-Hun Kim (Duke Univ.), Hong-Pil Kim (Kyungil Univ.), Hai-Won Yang(Hanyang Univ.)

A robust control for robot manipulators actuated by induction motors using neural networks(NNs) is considered. The control is designed to compensate for nonlinear dynamics associated with the mechanical subsystem and the electrical subsystems only with the measurements of link position, link velocity and stator winding currents. Two-layer NNs are used to approximate unknown functions occurring from parameter variation during backstepping design process. Specially, through the use of nonlinear observers for rotor flux, observed backstepping controller is designed to achieve uniform ultimately bounded link position tracking of the given reference signal...

13:00 – 13:50 **I-TMP-6**

A Robust Levitation Controller Design for Electromgnetic Levitation System

Choon-Kyung Kim. Jong-Moon Kim, Min-Kook Park, and Soon-Man Kwon (Korea Electrotechnology Research Institute)

In this paper, a robust levitation controller for an attractive MAGLVE system is designed. The design of an H∞ controller based on LMI method is proposed for the control of a simple magnetic levitation system. Attractive MAGLEV system is highly nonlinear and open-loop unstable, and has a very restricted equilibrium region. Also, this system has to tolerate various disturbances caused by propulsion. Thus a robust feedback controller is needed to control the system efficiently. We first formulate a mathematical model for the single magnet levitation system. Then we set up an H∞ control problem as a mixed sensitivity problem where the augmented plant is constructed with frequency weighting functions...