I-SE02 Control Theory/Application

15:20-17:20 **Chair : Sang Bong Kim (Pukyong Univ.)**
Room : C106 **Co-Chair : Sugimoto Hidehiko (Fukui Univ.)**

15:20 – 15:40 **I-SE02-1**

A Study on the ECU and Control Algoithm of ABS for a Commercial Vehicle

Ki-Chang Lee, Mun-Sub Kim, Jeong-Woo Jeon, Don-Ha Hwang, Doh-Young Park, Yong-Joo Kim(KERI)

Anti-lock Braking System(ABS) is a device which prevents the wheels form locked up under emergency braking of a vehicle. So it helps the vehicle to maintain the steerability and shortens the braking distance by maintaining optimal frictional force during braking since the tire road slip is controlled in acceptable range. Recently, ABS is accepted as a standard equipment in vehicles, especially in commercial vehicles(bus and trucks). Commercial vehicles don't use hydraulic lines but use pneumatic lines for braking system mostly. In this paper, ECU(Electronic Control Unit) for the anti-lock braking system of a commercial vehicle which is equipped with a full-air brake system and its control algorithms are presented. In this algorithm wheel speed acceleration flags and wheel slip flags are defined...

15:40 – 16:00 **I-SE02-2**

One Proposal of Vector Control Method of Wound-Rotor Induction Motor

H. Sugimoto, S. Kawasaki
(Fukui Univ.)

This paper is concerning a vector control of wound-rotor induction motor from the secondary side. When the wound-rotor induction motor is vector controlled from the secondary side, it has the possibility that the vector control can be accurately done because the disturbance input, that is, primary voltage and all state variables, that is, primary currents and secondary currents can be detected. We consider it is deserve research that the vector control of wound-rotor induction motor from the secondary side, because there is the merit that we can reduce the inverter capacity to on the order of half of the motor capacity when we choose twice of the synchronous speed to the rated speed, though there is the problem of the brush maintenance. In this paper, the vector control method of wound-rotor induction ...

16:00 – 16:20 **I-SE02-3**

Modeling and Control of Active Suspension System with Full-Car Wheels

Trong Hieu Bui, Sang Bong Kim(Pukyong Univ.), Choong Hwan Lee, Min Saeng Shin(Yang-San College)

This paper presents a modeling and control method of active suspension system with full-car model by using H_∞ control theory. The full-car model has seven degree of freedom including heaving, pitching and rolling motions. As the control method, H_∞ controller is designed so as to guarantee the robustness of closed loop system under the presence of uncertainties and disturbances. Active system with H_∞ controller can reduce the accelerations of the car-body in the heaving, pitching and rolling directions. The effectiveness of the controller is proved through simulation results in both time and frequency domains.

16:20 – 16:40 **I-SE02-4**

Modeling and Control of Gantry Crane with Arm Type of Oscillation Stopper

Soung Jea Park, Kwang Zu Kim, Sang Bong Kim (Pukyong Univ.), Tan Tien Nguyen(Hochiminh City Univ.), Min Seng Shin(Yangsan College)

The oscillation of a crane system is divided into the oscillation of container in respect of its trolley and the oscillation of trolley in relation to the whole crane system. We introduce a new type of crane system that avoids to the irreducible sway of crane system caused by hanging cables. The cables suspending the spreader are replaced by using an "anti-sway system". The proposed system is composed of mechanical arms with function of anti-sway based on conventional line system. The effectiveness of the proposed new type crane system and the controller is shown through the simulation results.

16:40 – 17:00 **I-SE02-5**

Predictive Control of Telerobot with Time Delay

In-Hyung Yoon, Jung-Kwan Kim, Myung-Chul Han
(Pusan Univ.)

In the teleoperation system, force, position and velocity signals are communicated between master and slave arm. The addition of force feedback for the teleoperation system benefits the operator by providing more information to perform given tasks especially for tasks requiring contact with environment. When the master and slave arms are located in different places, time delay is unavoidable. Also it is well known that the system can become unstable when a time delay exists in the communication channel. The proposed control strategy is to use predictive control method(MBPC). The predictive controller is used to control teleoperation's position and force control. Also it is used to overcome time delay.

17:00 – 17:20 **I-SE02-6**

Attitude Control of a Vehicle under the Disturbances by Sliding Mode Controller with Reaction Jets

Sung-Han Son, Jinsu Kim, Kang-Bak Park(Korea Univ.), Teruo Tsuji, Tsuyoshi Hanamoto(Kyushu Institute of Technology)

An attitude control of an air vehicle based on the variable structure control is proposed. For an air vehicle, minimum weight is required. Thus, it is desired to reduce the input energy. The optimal state portrait curve using time-varying sliding surface is proposed to reduce the control energy. Tracking performance of the closed loop system is guaranteed under the existence of parameter variation and external disturbances.