D-SP01 Automative Control

13:00-15:00 **Chair : Park Youngjin (KAIST)**
Room : 4127 **Co-Chair : Hong Keum-Shik (Pusan Univ.)**

13:00 – 13:20 **D-SP01-1**

Preview Control of High Mobility Tracked Vehicle Suspension

Kim Yoon Sun, Park Youngjin(KAIST)
Kwak Byunghak(Mando Corp)

The role of suspension system in tracked vehicles cannot be overestimated because the driving and running conditions of such vehicles are very severe. It reduces the vibration and shock which are generated by road profile in running condition. As the tracked vehicle's running speed increases, more undesired vibrations can be generated by road profile particularly in the situation of field running. Because, the excessive vibration can harm the operation ability of crewmen and stability of complex equipments, the maximum running speed is limited. In this study, to improve the performance of the tracked vehicle system, we examined the feasibility of using the active preview control for the tracked vehicle's suspension system. First, we developed ...

13:20 – 13:40 **D-SP01-2**

The Development of Body Control Module using In Vehicle Network

Lee Seong-Hun, Son Jun-Wu(Daewoo Telecom Ltd.)
Lee Suk(Pusan National Univ.)
Choi Bong-Yeol(Kyungpook Univ.)

Increasing demand for safety features, driving comfort and operational convenience in automobiles requires an intensive use of electronic components such as sensors, actuators and Electronic Control Unit(ECU)'s. These growing number of electronics has given rise to problems concerning the increasing number, size and weight of the wiring harnesses. In order to resolve these problems, multiplexed wiring systems such as Controller Area Network(CAN) serial communication protocol are applied in vehicle. This paper introduces the development of Body Control Module(BCM)s using multiplexed wiring systems. The BCM's were developed and implemented using CAN, the most popular choice of in-vehicle communication protocols.

13:40 – 14:00 **D-SP01-3**

Adaptive Control of the Active Pantograph for a High-Speed Train

Park Inki, Park Tongjin, Wang Yeungyong, Han Changsoo(Hanyang University)
Chung Kyungryeol(KITECH)

Electric power collection is one of the most important factors for the high-speed trains' operation. For the stable current collection, the contact wire of a catenary and the panhead of a pantograph should maintain a constant contact each other. In this paper, the catenary was modeled as a spring with time-varying stiffness from the point of a pantograph moving along the catenary, and the pantograph was modeled as a 3-D.O.F. mass-spring-damper system. Using the adaptive control method, the desired control performance could be obtained with the modeling errors and the time varying parameters. Also the state estimator was used considering the difficulty of applying the sensors obtaining feedback signals. Simulations were accomplished in various ...

14:00 – 14:20 **D-SP01-4**

Robust Wheel Slip Controller for Vehicle Stability Control

Byung-Hak Kwak(Mando Corp.)
Young-Jin Park(KAIST)

Vehicle stability control system can enhance the vehicle stability and handling in the emergency situations through the control of traction and braking forces at the individual wheels. To achieve the desired performance, the wheel slip controller manages the hydraulic braking system to generate the desired braking force at each wheel. In this study, we propose the wheel slip controller for the generation of the braking forces based on multiple sliding mode control theory with the pulse width modulation. The proposed controller follows to the slip ratio and the brake pressure the desired ones so that the vehicle stability controller can intervene braking force at each wheel. We show the validity and usefulness of the proposed controller through computer simulations.

14:20 – 14:40 **D-SP01-5**

Modeling and Dynamic Characteristics Analysis of a Continuously Variable Damper with Electro-Hydraulic Pressure Control Valve

Do Hong-Moon, Sohn Hyun-Chul and Hong Keum-Shik
(Pusan National University)

In this paper, mathematical modeling and dynamic characteristics analysis of a continuously variable damper used for semi-active suspension systems are investigated. After analyzing the geometry of a typical continuously variable damper, models for various components including piston, orifices, spring, and valves are proposed and the flow equations during expansion and compression strokes are derived. To verify the mathematical models developed, the dynamic characteristics of the models are simulated using MATLAB/SIMULINK and are compared with experimental results. It was confirmed that the developed models represent well the actual damper and can be used for control system design.

14:40 – 15:00 **D-SP01-6**

Web Based Remote Control System of Reclaimer Using Wireless PDA

Lee Kwan Hee, Bae Hyo Jung
(RIST)

Various raw materials from which iron and steel are made are unloaded from ship and then piled up at the designated yard. The equipment that piles up the raw materials is called Stacker and these materials are then dipped out and sent to unit factories such as blast furnace and cokes using the equipment called Reclaimer. The Reclaimer has an actual size of 16 meter high and 50 meter long and runs back and forth over the rail of about 1.2 km, carrying the materials to each unit factory. Until now, in most cases, Stacker and Reclaimer are manually operated. At POSCO, four workers on a shift basis sit in the operation room as shown in the picture , pile up and dip out the materials, checking them out with their own eyes. ...