

# D-FA02

## Robot Control

09:00 – 11:00

Chair : Seo Chang-Jun (Inje Univ.)

Room : 4128

Co-Chair : Park Chansik (Chungbuk National Univ.)

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09:00 – 09:20

D-FA02-1

### **A Robust Control with The Bound Function of Neural Network Structure for Robot Manipulator**

Ha In Chul and Han Myung Chul  
(Pusan National Univ.)

The robust position control with the bound function of neural network structure is proposed for uncertain robot manipulators. The neural network structure presents the bound function and does not need the concave property of the bound function. The robust approach is to solve this problem as uncertainties are included in a model and the controller can achieve the desired properties in spite of the imperfect modeling. Simulation is performed to validate this law for four-axis SCARA type robot manipulators.

09:20 – 09:40

D-FA02-2

### **Development of a Robot Off-Line Programming System with Collision Detection**

Lee Sang Cheol and Lee Kwae Hi  
(Sogang University)

In this paper, we present a robot off-Line programming system with collision detection. The collision detection is a very important factor of robot off-line programming system for collision avoidance, path planning, and so on. The System developed in this paper, basically using an algorithm for the minimum distance calculation between general polyhedra. The proposed system shows an exact and interactive result in static and dynamic environments.

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09:40 – 10:00

D-FA02-3

### **VHDL Module Implementation of High-speed Wireless Modem using Direct Sequence Spread Spectrum Communication Method**

Lee JungHa and Kim IlHwan  
(Kangwon National University.)

In this paper, we have designed the VHDL module of DS/SS-QPSK wireless modem processor for digital data communication. The spread spectrum method is used for modem processor, because this method guarantees good frequency efficiency and higher security. Also, it guarantees good performance in digital communication system under multi-path interferences. The differential encoder and decoder are used for simple circuit composition in the signal detection. For the synchronization of receiver, matched filter and power detector are used. And the IF modulation /demodulation of QPSK method is used in the digital level. The transmitter of VHDL modem processor consists of differential encoder, PN code generator, and QPSK ...

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10:00 – 10:20

D-FA02-4

### **Performance Evaluation of Maritime GPS Attitude Finding Receiver**

Choi Byungmoom, Lee Heon and Park Chansik  
( Chungbuk National University)

A 24 channel L1 C/A-code GPS attitude-finding receiver is designed and implemented. The performance of developed receiver is evaluated under the various environments. The results show that the performances from land and maritime test are almost same in the calm lake. And it follows the expected performance derived from an analysis. It is expected that the developed receiver can be used in not only maritime applications but also land and air applications where the heading is required.

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10:20 – 10:40

D-FA02-5

### **Robust Control Design for Robots with Flexible Joint and Link**

Jung Eui Jin, Ha In Chul, Kim Chang Gyl and Han Myung Chul  
(Pusan National Univ.)

In this work, we consider the flexible manipulator system. Generally, the manipulator system may often be made on the base of the imperfect modeling, joint friction, payload change, and external disturbances. These elements are uncertain factors. These uncertainties and flexibility make difficult to control the system. To overcome these defects, a class of robust control law is proposed for the flexible manipulator system and the singular perturbation approach is applied. To show the effectiveness of this control law, simulation is presented for one degree of freedom flexible joint and flexible link system.