

# I-SMP01

## International Poster Session

13:00-13:50

Chair : Kwon Oh-Kyu (Inha Univ.)

Room : Terrace(3F)

Co-Chair : Park Poo-Gyeon (POSTECH)

13:00 – 13:50

I-SMP-1

### System Identification and Modeling for the Simulation of Tire Roller

Min Seok Ko, Seong Hark Jeong, Sang Gyum Kim, Jung Ha Kim  
(Kookmin Univ.)

Tire roller is one of the most useful machines for the road constructions site. In this research, we are trying to develop tire roller which is operated by hydraulic transmission system instead of mechanical one. Now, we are trying to design the controller of tire roller in order to improve performance. Our present system model is somewhat different from the actual experimental results. Therefore we would like to develop new accurate modeling through ARX model by system identification method with random inputs. In this paper, we applied it to the steering system only. Later we will apply it to the traction system and expand to the whole tire roller system.

13:00 – 13:50

I-SMP-2

### Modeling and Identification of Human Mind using a Robot Which Walks Together

Tomohiro Hayashi, Ai Sato, Michio Ohta (Tsukuba Univ.)

To achieve a cooperative work between human and robot, it is thought helpful to estimate the states of human mind, which originates his behavior. In this paper, human mind was considered to modify instinctive desires according to the conditions of external world surrounding the instinct. A simple human mind model was designed so that it finds a balance between instinctive desire and restriction from the external world. The external world is divided into three sub-worlds like subject's whole body, its partner and concerned periphery. Proposed mind model has three-layers construction. Each of the layer tries to find a balance between desire and restriction from external world. In each layer, the role of finding the balance was expressed by an identical optimal control minimizing a performance index function of quadratic form with a weight factor, which is rearranged and named ...

13:00 – 13:50

I-SMP-3

### Design and Graphic Simulation of a Cleaning Robot for a Radioactive Environment Application

K. Kim, J. Park, M. Yang(Korea Atomic Energy Research Institute),  
C. Oh(Chonbuk Univ.)

This paper describes design features of a cleaning robot for use in a radioactive zone of the isolation room of the Irradiated Material Examination Facility (IMEF) at Korea Atomic Energy Research Institute (KAERI). This cleaning robot is intended to completely eliminate human interaction with hazardous radioactive contaminants. The cleaning robot that is operated either by manual mode or by autonomous mode is designed to be capable of cleaning the isolation room's floor surface and collecting dry nuclear fuel debris and other radioactive waste placed on the floor. The functional, mechanical and electrical design considerations of the cleaning robot in terms of remote cleanup operation and remote maintenance at a radioactive environment are presented. A graphical representation of the cleaning ...

13:00 – 13:50

I-SMP-4

### Adaptive Control of Robot Manipulator using Neuro-Fuzzy Controller

Se-Jun Park, Seung-Hyuk Yang, Tae-Kyu Yang (Mokwon Univ.)

This paper presents adaptive control of robot manipulator using neuro-fuzzy controller. Fuzzy logic is control incorrect system without correct mathematical modeling. And, neural network has learning ability, error interpolation ability of information distributed data processing, robustness for distortion and adaptive ability. To reduce the number of fuzzy rules of the FLS(fuzzy logic system), we consider the properties of robot dynamic. In fuzzy logic, speciality and optimization of rule-base creation using learning ability of neural network. This paper presents control of robot manipulator using neuro-fuzzy controller. In proposed controller, fuzzy input is trajectory following error and trajectory following error differential...

13:00 – 13:50

I-SMP-5

### Generation Human-like Arm Motion to Catch a Moving Object

Shinya Kajikawa (Akita Prefectural Univ.)

Robots are required to assist our activities in daily life. In this paper, we focus on arm movement to catch moving object as one of important tasks frequently performed by human. We propose an algorithm which enables a robot to perform human-like arm motion to catch a moving object. First we analyze human hand trajectories and velocity profiles to catch an object. From the experimental results, we extract some characteristics in the process of approaching and following a moving object and confirm that these are necessary to realize human-like motion. We then adopt an instantaneous optimal control method which evaluates the error and energy cost at each sampling step, and design two time-varying weight matrices to introduce human characteristic into robot motion. The matrix concerning the error is defined as a time-increasing ...

13:00 – 13:50

I-SMP-6

### Development of confocal scanning microscopy using acousto-optical deflector

J.W. Seo, D.K. Kang, H.G. Yun, K.H. Kim, D.G. Gweon (KAIST)

Confocal scanning microscopy (CSM) has an important role as the three-dimensional profiler. An image distribution can be reconstructed by a correlation analysis of spots with the bandwidth of radio frequency. But it is a serious problem for the high performance to align the optical components. Especially, the parasitic motion of focus on the detector gives rise to the fatal distortion of an image profile named the extinction effect while using acousto-optical (AO) deflector. An image profile can be regenerated in CSM with many advantages of non-contact, high speed and high resolution comparatively. In addition to the axial response of the primary focus, the lateral movement of it gives a necessity of the unitary lens to the scanning system. While using the beam deflector, the pupil of beam may be fixed at the nominal position. Furthermore, the use of a deflector may result in ...