

# D-FMP02 Domestic Poster Session

14:00-14:50 Chair : Huh Uk-Youl (Inha Univ.)  
Room : Terrace(3F) Co-Chair : Kim In Won (Konkuk Univ.)

14:00 – 14:50 D-FMP-31

## Implementation of Unmanned Remote supervisory System having Multipurpose Measuring Modules

Park Jung Hoon, Hong Sung Hoon, Kang Moon Sung  
(Chongju Univ.)

In this paper, we have studied for development of unmanned remote supervisory system using mobile communication network, not wire network, not to be affected by space or distance. The unmanned remote supervisory system consists of data processing unit (main part) and measuring systems (modules part)-temperature measuring module, humidity measuring module and human body sensing module. The data processing unit to collect and process informations of each measuring module has the functions of data communication between a mobile cellular telephone and measuring systems. Each measuring module has supervisory and warning functions for a target of supervision. And then we have designed each system and evaluated accuracy and reliability of the combined total system.

14:00 – 14:50 D-FMP-33

## Slices Analysis Method of Petri nets in FMS Using the Transitive Matrix

Kim JungWon, Lee Jongkun, Song Yujin, Kim Jongwook  
(Changwon Univ.)

In this paper, we focus on the analysis of the scheduling problem in FMS after slicing off some sub-nets using the transitive matrix. This class of Time Petri nets is obtained by merging subnets based on the machine's operations. We can divide original system into some subnets based on machine's operations using Time Petri nets slice and analyze the feasibility time in each schedules. In this paper, we show the usefulness of transitive matrix to slice off some subnets from the original net, and explain on an example.

14:00 – 14:50 D-FMP-35

## Development of Force Reflecting Joystick for Field Robot

Song In Sung, Ahn Kyung-Kwan, Yang Soon-Yong, Lee Byung-Ryong  
(Univ. of Ulsan)

In teleoperation field robotic system such as hydraulically actuated robotic excavator, the maneuverability and convenience is the most important part in the operation of robotic excavator. Particularly the force information is important in dealing with digging and leveling operation in the teleoperated excavator. Excavators are also subject to a wide variation of soil-tool interaction forces. This paper presents a new force reflecting joystick in a velocity-force type bilateral teleoperation system. The master system is electrical joystick and the slave system is hydraulically actuated cylinder with linear position sensor. Particularly Pneumatic motor is used newly in the master joystick for force reflection and the information of the pressure of salve cylinder is measured and utilized as the force feedback signal. Also force-reflection gain greatly affects the ...

14:00 – 14:50 D-FMP-32

## Embedded Web Server for Monitoring and Control of a Mobile Robot

Sin Yonggak, Kwak Jaehyuk, Lim Joonhong  
(Hanyang Univ.)

In this paper, we propose an efficient configuration of a system for the remote control of a mobile robot. The interface has a video feedback and runs in standard web environments. For control servers of mobile robot and CCD camera, we use the environment with embedded web server. Specific program has been developed in order to grab the images using Microsoft Visual C++. The external camera sends the video signal to a framegrabber in the PC, then this program grabs the images and puts them in shared memory in BMP format. For a video feedback, we use image feedback based on the client pull technique supported by Netscape and Internet Explorer.

14:00 – 14:50 D-FMP-34

## A Study on Trajectory Tracking Control of Field Robot

Seo Woo Seog, Kim Sung Su, Yang Soon Yong, Lee Byung Ryong,  
Ahn Kyung Kwan  
(University of Ulsan)

Field robot represented by excavator can be applied for various kinds of working in manufacturing, construction, agriculture etc. because of the flexibility of its multi-joint mechanism and the high power of hydraulic actuators. In general, the dynamics of field robot have strong coupling, various kinds of non-linearity, and time varying parameters according to working conditions. Therefore, it is very difficult to describe the system well, and design controller systematically based on its model. This paper established the mathematical model of field robot driven by electro-hydraulic servomechanism and constructed the adaptive control system robust to external load variations. The proposed control system for the field robot was evaluated by the computer simulation, and the performance results of trajectory tracking were compared with that of PID control system.

14:00 – 14:50 D-FMP-36

## Research of Stable Grasping for Handling Tasks in Field-Robot

Park Kyung Taek, Kim Sung su, Yang Soon Yong, Lee Byung Rong,  
Ahn Kyoung Kwan(Univ. of Ulsan)  
Han Hyun Yong(Choonhae Univ.)

This paper aims to derive a mathematical model of the dynamics of handling tasks in field robot which stable grasping and manipulates a rigid object with some dexterity. Firstly, a set of differential equation describing dynamics of the manipulators and object together with geometric constraint of tight area-contacts is formulated by Lagrange equation. Secondly, problems of controlling both the internal force and the rotation angle of the grasped object under the constraints of area-contacts of tight area-contacts are discussed. The effect of geometric constraints of area-contacts on motion of the overall system is analyzed and a method of computer simulation for overall system of differential-algebraic equations is presented. Thirdly, simulation results are shown and the effects of geometric constraints of area-contact is discussed. Finally, it is ...