

# 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.)

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14:00 – 14:50

D-FMP-43

### Feature Based Map Building Method Using Sonar Data

Kang Byung Soo(KIMM) and Lim Jong Hwan(Cheju Univ.)

The paper presents a sonar based map building method. The environment is a room or area inside a building, which is composed of four types of geometric primitives(corners, edges, cylinders, and walls). We also assume the environment can be modeled into two dimensional map in terms of planes(walls), points(corner and edge), and circle(cylinder). In a real world where most of the object surfaces are specular ones, a sonar sensor suffers from a multipath effect which results in a wrong interpretation of the location of an object. To reduce the effect and uncertainty, the method employs a simple thresholding technique for extracting circular arc features called regions of constant depth(RCD) from scanning sonar data. The usefulness of the approach is illustrated with the results produced by sets of experiments.

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14:00 – 14:50

D-FMP-45

### Analysis of Dynamic Behavior of Natural Circulation Heat Recovery Steam Generators

Kim Sung Ho, Lee Chi Hwan and Cho Chang Ho  
(Doosan Corp.)

The dynamic behavior of heat recovery steam generators for combined cycle power plant is simulated in cases of startup and shutdown conditions. To ensure performance and design data, dynamic model of the HRSG was developed and dynamic simulation was performed. The dynamic analysis will undoubtedly reduce costs which is associated with plant startup and contribute to a smooth commercial plant operation.

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14:00 – 14:50

D-FMP-47

### A Study on target tracking system for a mobile robot using ultrasonic sensors

Kim Hon Hui, Han Dong Hui and Ha Yun Su  
(Korea Maritime Univ.)

The capability of environment recognition is very important for mobile robot. Especially, a function of target tracking is necessary in monitoring and watching an object using mobile robot. In general, vision sensors such as CCD camera and laser range finder were used for tracking of a moving target. However, they are not only affected by intensity of illumination in environment but also require high-performance processors to process large amount of data. Therefore, in this paper, we propose the construction of target tracking system for mobile robot using only ultrasonic sensors to cope with these problems.

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14:00 – 14:50

D-FMP-44

### Realization of biped walking robot

Ha Tae Sin, Kim Joo Hyung and Choi Chong Ho  
(Seoul National University)

This paper treats the implementation of a statically stable control system for a biped walking robot with 10 degrees-of-freedom. Statically stable walking of a biped robot can be realized by keeping the center of mass (COM) inside the sole of the supporting foot (or feet) during single-support or double-support phases. We predetermined five static positions for walking based on the COM method. The positions can be represented by the length of the gait, the width between the feet, the height of the foot and two parameters in the hip movement. With the five parameters, we calculated the position trajectory. And we got the angular trajectories of 10 joints from the position trajectory using the position tracking control and neural network. By tracking the angular trajectories, the robot can walk maintaining stability. We implemented walking of a biped robot through the above ...

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14:00 – 14:50

D-FMP-46

### Robust Force Control of Electro-hydraulic Manipulator in the Field Task

Cho Yong-Rae, Ahn Kyoung-kwan, Yang Soon-Yong and Lee Byung-Ryong  
(Univ. of Ulsan)

Hydraulically driven manipulators are superior to electrically driven ones in the power density and electrical insulation. But an electro-hydraulic manipulator using hydraulic actuators has many nonlinear elements, and its parameter fluctuations are greater than those of electrically driven manipulator. So it is relatively difficult to realize not only stable contact work but also accurate force control for the autonomous field tasks such as the maintenance task of high voltage active electric line or the automatic excavation task by hydraulic excavator. In this report, we propose robust force control algorithm, which can be applied to the real field task such as the construction field, nuclear plant and so on. Proposed force controller has the same structure as that of disturbance observer for position control. The difference between force and position disturbance observer is that the input and output of disturbance ...

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14:00 – 14:50

D-FMP-48

### A Navigation Algorithm for Autonomous Mobile Robots using Artificial Immune Networks and Fuzzy Systems

Kim Yang-Hyun, Lee Dong-Je, Lee Min-Jung and Choi Young-Kiu  
(Pusan National Univ.)

The purpose of navigation algorithm is to reach a given target point without collision with obstacles while an autonomous mobile robot is navigating. To achieve a safe navigation, this paper presents an effective navigation algorithm for the autonomous mobile robot equipped with ultrasonic sensors in unknown environments. The proposed navigation algorithm consists of an obstacle-avoidance behavior, a target-reaching behavior and a fuzzy-based decision maker. In the obstacle-avoidance behavior and the target-reaching behavior, artificial immune networks are used to select a proper steering angle, make the autonomous mobile robot avoid obstacles and approach a given target point. The decision maker using fuzzy inference systems weights the steering angles selected ...