I-FE02 Robot & Measurement Application

15:20-17:20 **Chair : Yoshichika Fujika (Hachinohe Institute of Technology)**
Room : C106 **Co-Chair : Doo Yong Lee (KAIST)**

15:20 – 15:40 **I-FE02-1**

Development of Load Control and Demand Forecasting System

V. Tipsuwanporn, K. Srisuwan, T. Suesut, S. Kulpanich, P. Roengruen(King Mongkut's Institute of Technology Ladkrabang)

This paper presents a technique to development load control and management system in order to limits a maximum load demand and saves electric energy consumption. The computer programming proper load forecasting algorithm associated with programmable logic control and digital power meter through inform of multidrop network RS 485 over the twisted pair, over all are contained in this system. The digital power meter can measure a load data such as V, I, pf, P, Q, kWh, kVarh, etc., to be collected in statistics data convey to data base system on microcomputer and then analyzed a moving linear regression of load to forecast load demand. Eventually, the result by forecasting are used for compost of load management and shedding for demand monitoring, Cycling on/off load control, Timer control, and Direct control. In this case can effectively reduce the electric energy consumption cost for 10%.....

15:40 – 16:00 **I-FE02-2**

Multi-Layer Printed Wiring Board with Built-In Soldering Heater and 3D Implementation of Dynamically Reconfigurable Highly Parallel Processors

Yoshichika Fujioka, Nobubiro,Finabecgu
(Hachinohe Institute of Technology)

In the intelligent integrated systems, the delay time must be reduced using highly parallel processors, as well as high throughput performance. In this paper, we propose a new concept for building 3D highly parallel processors using multi-layer printed wiring boards with built-in soldering heater (BISH-PWB). The proposed BISH is realized with the long and narrow cupper wiring pattern on the internal layer in the terminal pattern area. Based on the linearity of the cupper resistance vs. temperature, we can measure the BISH temperature and its calorific value from the heater voltage and current measurements. If we provide the BISH temperature control systems for each BISH, selective multi-point soldering can be realized with same ...

16:00 – 16:20 **I-FE02-3**

Formation Approach for Mobile Robots with Inaccurate Sensor Information

Gunhee Kim(KIST),
Doo Yong Lee, Kyungno Lee(KAIST)

This paper develops a control approach to generic formation tasks of multiple mobile robots with inaccurate sensor information. Inaccurate sensor information means that all the robots have only local sensors which cannot accurately measure absolute distances and directions of objects. The control logic is developed considering generic situations in order to adapt to increasing number of robots which participate in the formation. Petri nets are used for modeling and design of the control logic, which can visualize the control models and make it easy to check the states of each robot. Physically homogenous mobile robots are designed and built to evaluate the developed logic. Each robot is equipped with eighteen infrared sensors and a UHF transceiver module. The developed control.....

16:20 – 16:40 **I-FE02-4**

Supervisor for Real-Time Nondeterministic Discrete Event Systems Under Bounded Time Constraints

Seong-Jin Park(Samsung Electronics),
Kwang-Hyun Cho(Ulsan Univ.), Jong-Tae Lim(KAIST)

This paper addresses a supervisory control problem to meet bounded time constraints in real-time nondeterministic discrete event systems (DESs) represented as timed transition models. For a timed language specification representing a bounded time constraint, this paper introduces the notions of trace-controllability and time-controllability. Based on the notions, this paper presents the necessary and sufficient conditions for the existence of a supervisor for a real-time nondeterministic DES to achieve the specification.

16:40 – 17:00 **I-FE02-5**

Swing-up Control and Singular Problem of an Acrobot System

Taek Kun Nam, Tsutomu Mita
(Tokyo Institute of Technology)

In this paper, we address the swing up control and the singular problem of an acrobot. We derive a serial system equation from the acceleration constraint that there is no actuator on the first joint. Based on the serial system representation, we propose a swing up and stabilization control algorithm to move the acrobot from its downward equilibrium to its inverted equilibrium position. Simulation result is also provided to show the effectiveness of the proposed control strategy.