D-FE04 Electric Machine

15:20-17:20 **Chair : Oh Seong-Bo (Cheju National Univ.)**
Room : 4133 **Co-Chair : Hong Sun Gi (Hoseo Univ.)**

15:20 – 15:40 **D-FE04-1**

A Study on the Torque Angle Compensator Design of an IPM Type PM Synchronous Motor

Young-Chul Byun, Hyuck-Soo Jeon
(Agency for Defense Development)

Nowadays due to the remarkable advance of power electronics and micro controller, a Brushless AC servo-motor which has the characteristics of the high inertia to torque ratio, the high power density, the maintenance free, and so on is being used widely in industrial robots, machine tools, and factory automation. In a conventional DC motor, the polarity commutation is performed of itself by mechanical brush and commutator, but the PM synchronous motor requires an electrical commutation according to the rotor position. Then for the maximum torque production PM synchronous motor has to be equipped with a controller which maintains the optimal phase angle between the stator field and the magnetic field...

15:40 – 16:00 **D-FE04-2**

Analysis of a Chip Mounting System for Force and Impact Control

Lee Duk-Young, Cho Hyungsuck(KAIST)
and Shim Jae-Hong(KPU)

This paper presents identification and control of a surface mounting system. The mount head of the system is modeled to analyze its dynamic characteristics, which is critical to the placement performance of the mounter. Based on this model, an identification work is carried out to estimate the modeled parameters by using genetic algorithm (GA), which plays a role of minimizing an error between the actual response and the model response. Having obtained the identified parameters, we design a disturbance observer control to compensate the friction. The disturbance observer can estimate the friction force and the uncertainty of the system. From the experimental results, it is found that the proposed disturbance observer plus PID controller show a better performance than PID controller alone. In order to accomplish a stable contact control for fast mounting a ...

16:00 – 16:20 **D-FE04-3**

Power System Stabilizer using the Free Model

Kim Hochan, Oh Seongbo(Cheju National University)
and Lee Kwangyeon(Pennsylvania State Univ.)

The free-model concept is introduced as an alternative intelligent system technique to design a controller with input and output data only. The idea of free model comes from the Taylor series approximation, where an output can be estimated when such data as position, velocity, and acceleration are known. The parameters in the free model can be estimated using the input-output data and a controller can be designed based on the free model. The free model thus developed is shown to be controllable, observable, and robust. The accuracy of the free-model approximation can be improved by increasing the observation window and the order of the free model. The LQR method is applied to the free model to design power system stabilizers ...

16:20 – 16:40 **D-FE04-4**

A Sensorless Vector Control System for Induction Motors Using Stator Current Difference

Park Chul Woo, Choi Byeong Tae, Kwon Woo Hyen(Kyungpook National University) , Ku Bon Ho(Kyungil Univ.) and Youn Kyung Sub

The thesis propose the sensorless vector control method that estimates the rotor speed using stator current. The estimated speed is used as feedback in a vector control system. The conventional MRAS structure has a problem the error output is decreasing as estimated speed error is increasing and the estimation performance is not robust when mutual inductance has been changed. In the proposed method, error output is proportional to estimated speed error. The described technique is less complex, robust to variations of mutual inductance. This new method can achieve much wider bandwidth speed control than that of the conventional MRAS structure.