

# I-TE04

## Man-Machine Systems 3

15:20-17:20  
Room : C203

Chair : Yokoyama Naoyo (Yokohama National Univ.)  
Co-Chair : T. Ishimatzu(Nagasaki Univ.)

15:20 – 15:40

I-TE04-1

### Power Assist Control for Walking Aid by HAL Based on Phase Sequence and EMG

Suwoong Lee, Yoshiyuki Sankai  
(Univ. of Tsukuba)

This paper describes a control method of hybrid power assistive system for lower body, HAL, with the techniques of Phase Sequence and the application of EMG. Our objective is to attain the power assist control of motion in the lower body effectively with these two methods. The Phase Sequence which performs basic motion controls of HAL is the method that a motion, the Task, is accomplished by dividing each motion into the unit named Phase and ...

15:40 – 16:00

I-TE04-2

### An Interactive Interface for Rapid Motion Modification of an Articulated Object Model with Multiple Joints and Its Application to Kendo Coaching

Naoya Yokoyama(Yokohama National Univ.), Fuminori Nakiri,  
Yasuhiro Kushihashi, Shinya Aoyama, Tsunenori Honda (Tokyo Univ.)

A method of interactive human interface for motion modification of an articulated object model like a human body, a multiple joints robot, etc. has been developed, and implemented to a human body motion model. In the case of computer software models, the initial data setting for overall motion is rather easy. However, modifying or correcting the initially set motion is rather difficult for keeping consistency. In this research, the requirements shown below have mainly been set as the specifications...

16:00 – 16:20

I-TE04-3

### Communications with a Brain-wave bio-potential based computer interface

Choi Kyoungcho, Minoru Sasaki  
(Gifu Univ.)

The overall aim of this research is to develop a computer communication interface based on brain-wave bio potentials for physically disabled people. The work focuses on using EOG and EMG signals to input characters one by one using cursor movements on a GUI screen. The Cyberlink™ system is used to acquire brain waves in real time with electrodes. EMG and EOG signals are used to direct a cursor in order to select, or to click on a character on the screen. We present a novel method for automatic EOG pattern detection by using wavelet transforms with a neuro-fuzzy approach...

16:20 – 16:40

I-TE04-4

### EMI and Switching Loss Reductions of a Full-Bridge PWM Converter for DC Motor Drive

S. Thanasana, A. Srisawang, Y. Prempraneerach  
(King Mongkut's Institute of Technology Ladkrabang)

This paper presents a Five-Switch Converter (FSC) circuit that can operate like a full-bridge PWM converter for driving the DC motor in bidirectional. One of the main advantages of this circuit is to reduce the on-off switching number of power MOSFET. In stead of turning on-off simultaneously two of the four power MOSFET's in a switching period, this circuit operates only one power MOSFET, while continuously leaving another two on and the other two off in the switching period. Consequently...

16:40 – 17:00

I-TE04-5

### The Analysis on the Deformation of Electrostrictive Polymer Film with respect to Time under Constant Voltage

Kyung Chul Park, Ji Won Yun, Jae Wook Jeon, Hyoukryeol Choi,  
Hunmo Kim, Jae-Do Nam(Sungkyunkwan Univ.)

Electrostrictive polymer is deformed by electric force generated by electric field built by high voltage. When high voltage is applied to the electrostrictive polymer film in which the electrodes such as conductive grease or carbon powder are installed, it expands in the direction of area. Because electrostrictive polymer is incompressible and electric force is applied to it in the direction of thickness. Electrostrictive polymer film in which electrodes are installed, functions as a parallel-plate capacitor. Therefore anode and cathode charges are piled up on both electrodes and there exists attractive force that functions as pressure in the direction of thickness. So the thickness of electrostrictive polymer becomes thicker...

17:00 – 17:20

I-TE04-6

### The Evaluation and Optimization of Welding Qualities in the RSW(Resistance Spot Welding) Process Using the Servo Controlled Gun

Yeong Je Park(Trimecs Co., Ltd.), Hyung Suck Cho(KAIST) and Ji Hwan Park(Nextech Co., Ltd.)

A servo gun welding system having a AC servo motor and a PC control system is presented for the improvement of quality control in the spot welding. The spot welding process is composed of the press stage, the weld stage, and the hold stage. The changes of gun press forces according to three stages in the spot welding process are controlled and measured through the load cell in order to know the influence on the welding quality. The relation between the measured force changes according to three stages and welding qualities is also implemented on the multi-layer perceptrons, one of supervised learning method of neural network, which are powerful for realization of complex mapping characteristics. The estimated results and ...