I-SP02 Robot Systems 2

13:00-15:00 **Chair : Sano Masaki (Univ. of Electro-Communications)**
Room : C106 **Co-Chair : Yoon Ji Sup (KAERI)**

13:00 – 13:20 **I-SP02-1**

Design and Performance Evaluation of Self-Localization with Landmarks

Yukihiko Ono, Takayuki Takahashi, Michihiko Shoji, and Eiji Nakano(Tohoku Univ.)

The main contribution of this research is that it gives:(1) a rational criterion to select the best self-localizing method for a particular situation, and (2) an appropriate arrangement of the landmarks to minimize the error. In this paper, the authors propose a set of indices to evaluate the accuracy of the self-localizing methods, and the indices are derived from a sensitivity which is defined as the ratio of the localizing error to sensor error. And then, we compare the accuracy of self-localizing a mobile robot with landmarks based on the indices, and propose a rational way to minimize the localizing error.

13:20 – 13:40 **I-SP02-2**

A Teleoperated Bilateral Control System for Heavy Duty Tasks

S.H. Ahn, S.H. Kim, D.H. Hong and J.S. Yoon
(Korea Atomic Energy Research Institute)

A heavy duty power manipulator consisting of high reduction ratio joints is usually used in heavy duty tasks. When the heavy duty power manipulator is used as the slave manipulator in the teleoperated bilateral control system, the position control performance of the slave manipulator and the system stability tend to deteriorate due to the windup phenomenon caused by actuator saturation. KAERI has developed a teleoperated bilateral control system for the study of the remote handling of a spent fuel mockup bundle, which has an enhanced bilateral control algorithm improving the position tracking performance of the slave manipulator while compensating for the windup phenomenon. In this paper, the developed bilateral control system ...

13:40 – 14:00 **I-SP02-3**

Cooperative Foraging Behavior of Multi Robot System with Simple Interaction

Ken Sugawara(JST), Masaki Sano(Univ. of Tokyo)., Ikuo Yoshihara (Miyazaki Univ.), Kenichi Abe(Tokyo Univ.) ,
Toshinori Watanabe(Univ. of Electro-Communications)

Researches of multi-robot system are active in these days. The most remarkable characteristic of multirobot system is that the robots work cooperatively and achieve the task which a single robot cannot do. It is essential to investigate number effect of multi-robot system. In this paper, we chose foraging task and investigated their behavior. At first, we investigated the foraging behavior in case that interaction range is infinite. Secondly, we investigated the behavior in case that interaction range is finite. In both case, we find out there is an optimum interaction duration.

14:00 – 14:20 **I-SP02-4**

Inertia Property-Based Redundancy Resolution in Posture Control of Mobile Manipulator

Sungchul Kang(KIST), Kiyoshi Komoriya, Kazuhito Yokoi, Tetsuo Koutoku and Kazuo Tanie(AIST)

This paper deals with the inertia property-based redundancy resolution in posture control of a mobile manipulator. As a measure for the redundancy resolution of a mobile manipulator, an effective inertia at the end effector in the operational space is proposed and investigated. The reduced effective inertia has a significant effect on reducing the impulse force in collision with environment. To find a posture satisfying both the reduced inertia and joint limit constraints, we propose a combined potential function method that can deal with multiple constraints. The proposed reduced inertia property algorithm is integrated into a damping controller to reduce the impulse force at collision and to regulate the contact force in mobile manipulation ...

14:20 – 14:40 **I-SP02-5**

Robust Predictive Control of Robot Manipulator with The Bound Estimation

Jung-Kwan Kim and Myung-Chul Han
(Pusan National Univ.)

The robust predictive control law which use the bound estimation is proposed for uncertain robot manipulators. Since the control design of a real manipulator system may often be made on the basis of the imperfect knowledge about model, it's an important tend to design a robust control law that will guarantee the desired performance of the manipulator under uncertain elements. In the preceeding work, the robust predictive control law was proposed. In this work, we propose a class of robust predictive control of manipulators with the bound estimate technique and the stability based on Lyapunov function is presented.