



Flexible Mechatronics for Robotics and Manufacturing

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Abstract

Flexible mechatronics has been critical and necessary to smart robots in unstructured environments and manufacturing equipment under complicated states since it is effective in addressing the needs for adaptability to nonlinear deformations and robustness under harsh conditions. Flexible mechatronics has the advantages of light weights, compact sizes, zero backlashes, quick response and high energy efficiency, thus have wide applications such as human-motion sensing, health inspection, bio-inspired actuation, process state monitoring, high precision positioning/transmission, intelligent fixation and so on. As flexible mechatronics is newly developed with soft robotics and intelligent manufacturing in recent years, there exist many challenging but urgent problems unsolved in the field. Topics of interest are categorized in modeling theories, design methods, fabrication techniques, control principles and illustrative applications. Besides, flexible mechatronics is an interdisciplinary research area involving researchers with diversified academic backgrounds, and it is desired to have a communication and discussion platform to exchange ideas and emerging achievements for better collaborations. In summary, the objectives of the tutorial include educating the community with basic principles and new achievements in flexible mechatronics, providing an instructive and informative platform with a discussion session to distribute newly emerging methods and techniques, attracting attentions from diversified communities for potential collaborations, and highlighting the role of mechatronics in recent developments of robotics and manufacturing.

Invited speakers and tentative presentation titles are listed as follows.

- Jiajie Guo, Huazhong University of Science and Technology
Presentation title: Multi-physical Field Sensing for Manufacturing and Robotics

- Chao-Chieh Lan, National Cheng Kung University
Presentation title: Modeling, design, and control of series elastic actuators

- Jingjing Ji, Huazhong University of Science and Technology
Presentation title: Hybrid Modeling and Measurement Methods for Physical Field Reconstruction

- Chih-Hsing Liu, National Cheng Kung University
Presentation title: Optimal Design of Motor-driven Soft Robotic Gripper for Grasping Unknown Objects