

# **IEEE ICM2021**

## **INTERNATIONAL CONFERENCE**

### **ON MECHATRONICS**

**7 - 9 MARCH 2021, KASHIWA, JAPAN**

**Special Session on**

**“Advanced Design Methods for Complex Mechatronic  
Systems and Systems of Mechatronic Systems”**

**Organized by**

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## **Call for Papers**

Abstract:

Research and development in mechatronic components and products is characterized nowadays by a distinctive paradigm shift towards emerging novel design, control and measurement methods that should consider multi-domain knowledge processing (Cyber-physical Systems) as well as continuously increased number of information flows (Big Data) and communication channels (Internet of Things) in a comprehensive way. As a result, the concepts of complex mechatronic systems and systems of mechatronic systems (SoMS) can be introduced. Their development and design require new methods for the system control with important intelligent functions as self-learning, operational environment recognition, cyber-security et al. Further practical implementation of these new methods should properly consider such factors as real-time applicability, actuator constraints, and fail-safety. Furthermore, complex mechatronic systems and SoMS cover many operational environments, which differ in dynamics, influencing uncertainties and other factors. Therefore, a possible unification of methods and a holistic approach responsible for the dynamics control, estimation, and disturbance rejection by systems design is highly demanded.

The purpose of this Special Session is to provide a forum for generating, exchanging, and following up the ideas, recent trends, and achieved results in engineering fields, which are closely related to designing complex mechatronic systems and SoMS. Both theoretical and application driven studies are invited for participation.

Topics of interest include, but are not limited to:

- Modelling and control of complex mechatronic systems and SoMS;
- Motion control of mechatronic systems with weakly known parameters and uncertainties;
- Complex mechatronic systems with human-in-the-loop;
- Systems of mechatronic systems for road, aerial, sea and underwater vehicles;
- Methods and algorithms for non-stationary disturbance estimation and rejection in context of complex mechatronic systems and SoMS;
- New validation and testing procedures by designing complex mechatronic systems and SoMS;
- Networked control of SoMS;
- Fail-safety and cyber-security of complex mechatronic systems and SoMS.

▪ IES Technical Committee Sponsoring the Special Session (if any):  
Technical Committee on Motion Control