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Special Session Title
Data Utilization for Advanced Motion Control

organized by

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Call for Papers

Outline of the Session (Max 250 words)

In recent years, new approaches to realize control based on huge amounts of data as control for systems that are difficult to model have been extensively studied. Typical examples include imitation learning, which uses machine learning to extract and reproduce skilled human behavior, and model predictive control, which enables control that satisfies constraints through real-time optimization calculations. This special session aims to deepen the discussion on such new types of control.

Data has traditionally been used as a matter of course for system identification and observers. However, it is becoming widely known that these can be improved in performance by using more complex models such as neural networks. There is still much room for discuss on how data should be used and modeled. For example, there is an increasing number of ways to treat a system as a stochastic system rather than as a deterministic system. Treating system noise by using the Kalman filter is already very common, but now there is also research on modeling uncertainty itself by using Gaussian process regression. Furthermore, sampling-based MPC, such as MPPI, which realizes model predictive control for such uncertain systems, is also within the scope of this session.

Topics of the Session
- o Machine Learning
- o System Identification
- o Model Predictive Control
- o Observer
- o Optimization
- o Data Driven Control

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