

# SS21: Uncertain Dynamic State Estimation

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This session widely discusses about dynamic state estimation and uncertain measure topics, and we aim to emergence of advanced autonomous intelligent systems. In the discussion, we try to fusion of state-space model, well known as optimum filter problem, theories and methodologies of state estimation, and fuzzy systems based on fuzzy sets and uncertain measures. Such fusion will earn the combination of advantages of the two disciplines that consist of mathematically rigorous and high accurate methodologies of the optimal filter theory and flexibility of soft-computing methodologies including fuzzy systems and fuzzy sets. It will find some solutions to many problems, in which one of the two discipline solely cannot solve each problem, by emerging new approach to the problems. So the aiming topics of this session highly relevant to the objective of the Joint 17th World Congress of International Fuzzy Systems Association and 9th International Conference on Soft Computing and Intelligent Systems.

This session consists of four presentations as shown in below with brief description in each. The topics of these presentations mainly deal with state estimation or prediction system, and are relevant to the objective of this session.

- 1) “Real-time Whole Body Imitation by Humanoid Robot based on Particle Filter and Dimension Reduction by Autoencoder”  
It applies particle filter and neural networks to robot’s state estimation.
- 2) “Kriging-based Prediction and Interpolation for Modeling Pedestrian Dynamics”  
It investigates the use of kriging, a spatial statistical tool in random fields, for modeling pedestrian dynamics.
- 3) “Stochastic Model on Low Resolution Characters and the Feature of Topological Invariant”  
It proposes stochastic modeling of low resolution characters and computation method of homology group.
- 4) “FML-based Prediction Agent and Its Application to Game of Go”  
It develops the four-stage fuzzy markup language based prediction agent and applies it Go,  $19 \times 19$  board game.