Editorial

Advanced Control Methods for Systems with Fast-Varying Disturbances and Applications

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In most real applications, disturbances and uncertainties, which affect stability and performance of the controlled system, are unavoidable. Unfortunately, disturbances are not measurable or too expensive to measure. A typical approach is first to estimate the disturbances and then design an advanced control law based on this estimation. Although this approach has attracted much attention of numerous researchers in various fields of study, most estimation techniques rely on the assumption that the disturbance is slowly varying or its time derivative is zero. Note that the disturbances do not arise only from external environments; uncertainties such as modelling errors and parameter perturbations can also be considered as disturbances. Also, for the objects with unknown components and noises, a good approach is to use the system with learning capability to adapt its parameters to the samples measured from the given objects.

From 36 submissions, 10 papers are accepted for publication in this special issue. Each paper was reviewed by at least one reviewer and revised according to review comments. The papers cover the following topics: time-varying noise estimation, search algorithm for minimizing the makespan, robust control for thyristor controlled series compensator (TCSC), robust technique for computing average consensus, sensorless control of uncertain PM-assisted SynRM, wind turbine frequency control in microgrid, optimization of power system stabilizer (PSS), adaptive sliding mode control (SMC) for hybrid synchronization of chaotic systems, model predictive control (MPC) for electric vehicles, and control of hydraulic turbine governing system.

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