

Special Section on:

Advances in Disturbance/Uncertainty Estimation and Attenuation

THERE IS EVEN INCREASING DESIRE ON ACHIEVING HIGH PRECISION CONTROL for new generations of mechatronics and robotics, electrical machines and drives, power electronics, energy conversion, aerospace and automotive systems. However disturbances and uncertainties caused by the changes of the physical system or its operational environment are widely present. As is well known, there are a number of conflicts/constraints in control system design (e.g. tracking vs disturbance rejection, and the nominal performance vs. robustness). Disturbance observer and related techniques provide a flexible framework in dealing with these challenges since 1983. In this group of techniques, an observer or alike is designed to estimate unknown external disturbance and (or) the influence of unmodelled dynamics/uncertainties. By the appropriate use of the outcome of the observer, disturbance rejection and robustness of an existing control system could be significantly improved. As such, disturbance and uncertainty estimation techniques play the core role in this kind of control algorithms. These control schemes are able to not only explicitly exploit the modelling information in control system design as many other control design methods, but also cope with unknown disturbances, unmodelled dynamics and various variations/uncertainties without sacrificing the nominal performance. The main objective of this Special Section is to bring the ideas of the worldwide research community working on various disturbance/uncertainty estimation and rejection methods in different engineering sectors into common platform, and to present the latest advances and developments in design methods for disturbance/uncertainty estimation, design methods for disturbance/uncertainty attenuation, stability and performance analysis, practical implementation, and various case studies of the applications of these techniques.

Editors invite original manuscripts presenting recent advances in these fields with special reference to the following topics:

- ✓ Advanced disturbance/uncertainty estimation: disturbance observer, extended state observer, unknown input observer, equivalent-input-disturbance based estimator, sliding-mode disturbance observer, and data/knowledge based disturbance modeling and analysis, etc.
- ✓ Advanced disturbances/uncertainties attenuation and rejection strategies: Disturbance Observer Based Control, adaptive control, sliding mode control, output regulation theory, and robust control, Active Disturbance Rejection Control, and composite anti-disturbance control for multiple disturbances
- ✓ Design and analysis tools: time domain and frequency domain design and analysis tools, relationship between different disturbance/uncertain estimation and rejection methods, design and analysis for systems with multiple disturbances
- ✓ Fault diagnosis and tolerant control: fault detection and diagnosis (FDD) using disturbance observer techniques, fault tolerant control, and operational condition/environment monitoring, and FDD for systems with both faults and disturbances
- ✓ Advance in hardware implementation of disturbances/uncertainties estimation and attenuation methods by FPGA, DSP, microcomputers, sensor networks, etc.

Manuscript Preparation and Submission

Check carefully the style of the journals described in the guidelines "Information for Authors" in the IEEE- IES web site: <http://www.ieee-ies.org/publications>.

On the submitting page #1 in pop-up menu of manuscript type, select: "SS on Advances in Disturbance/Uncertainty Estimation and Attenuation", then upload all your manuscript files following the instructions given on the screen.

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Timetable

Deadline for manuscript submissions:	Information about manuscript acceptance:	Publication date:
September 30, 2014	Spring, 2015	Autumn, 2015