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IEEE SIGNAL PROCESSING MAGAZINE

Special Issue on Time-Frequency Analysis and Applications

Aims and Scope — This Special Issue seeks to present recent advances in time-frequency (TF) signal analysis, using both linear and nonlinear decompositions. It invites new contributions in joint-domain signal representations for improved data analysis, detection, classification, localization, separation, reconstruction and tracking. It aims to capture new paradigms in dealing with nonstationary deterministic and random signals and to present progress in statistical, multi-dimensional and array signal processing from a time-frequency perspective. Among relevant topics is the reconstruction of nonstationary and transient signals from few observations or with missing data, which have become feasible in light of recent progress in compressive sensing and sparse signal recovery and the close link with the question of time-frequency uncertainty. In parallel, dealing with multivariate nonstationary signals prompts reconsideration of classical concepts such as instantaneous frequency or coherence, and to consider new ones such as non-harmonic oscillations or synchronization. Recent trends in fully data-driven time-frequency analysis (such as Empirical Mode Decomposition), raise significant theoretical challenges to provide sound mathematical grounds to such methods. One can cite new developments in reassignment and synchrosqueezing methods, and, more generally, techniques that exploit phase properties of signals and their transforms. The purpose of this Special Issue is to present new and effective time-frequency based approaches in various application areas, including biomedicine (ECG, EEG, EMG, etc.), Sonar and Radar (micro-Doppler and direction finding), communications (source separation, channel estimation), audio and music (analysis and synthesis), environmental data, etc. As such, we encourage paper submissions showing the role of time-frequency signal representations in solving key and pressing problems that would be difficult to address using single-domain analysis and processing.

Topics of Interest include (but are not limited to)
- Advances in detection, estimation and classification using TF signatures
- Instantaneous frequency estimation
- Robust TF signal representations
- New advances in TF localization and uncertainty principles
- Multidimensional extensions of TF concepts (instantaneous frequency, coherence, Riesz transform, etc.)
- Multi-sensor TF analysis and signal representations
- TF domain processing, time-varying systems, Gabor multipliers, non diagonal denoising
- Data-driven methods e.g. Empirical Mode Decomposition, Hilbert-Huang transform and related techniques
- Reassignment, synchrosqueezing and phase-based methods

Submission Process —The Special Issue seeks to offer broad coverage of the field including most recent developments in both theory and applications. Submissions of comprehensive overviews of methodological advances are strongly encouraged, as well as papers dealing with new and emerging applications. All submissions will be peer reviewed according to the IEEE and Signal Processing Society guidelines. Submitted articles should not have been published or be under review elsewhere. Manuscripts should be submitted online at http://mc.manuscriptcentral.com/sps-ieee using the Manuscript Central interface, see http://www.signalprocessingsociety.org/publications/periodicals/spm/ for guidelines and information.

Important Dates

White papers (4 pages) due : October 8, 2012	Revised manuscripts due : April 15, 2013
Invitation notification : October 23, 2012	Final acceptance notification : May 15, 2013
Manuscripts due : January 15, 2013	Final manuscripts due : June 15, 2013
Acceptance notification : March 1, 2013	Publication date : **November 2013**

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