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Signal Processing

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Call for papers

Special issue on Advances in Multirate Filter Bank Structures and Multiscale Representations

Scope

A century after the first outbreak of wavelets in Alfréd Haar's thesis in 1909, and twenty years after the advent of Multiresolution Analysis, filter banks and wavelet transforms lie at the heart of many digital signal processing and communication systems. During the last thirty years, they have been the focus of tremendous theoretical advances and practical applications in a growing digital world. They are for instance present, as local linear expansions, at the core of many existing or forthcoming audio, image or video compression algorithms.

Beyond standards, many exciting developments have emerged in filter banks and wavelets from the confrontation between scientists from different fields (including signal and image processing, computer science, harmonic analysis, approximation theory, statistics, bioengineering, physics,...). At their confluence, multiscale representations of data, associated with their efficient processing in a multirate manner, have unveiled tools or refreshed methods impacting the whole data management process, from acquisition to interpretation, through communications, recovery and visualization. Multirate structures naturally shelter key concepts such as the duality between redundancy and sparsity, as well as means for extracting low dimensional structures from higher ones. In image processing in particular, various extensions of wavelets provide smart linear tools for building insightful geometrical representations of natural images.

The purpose of this special issue is to report on recent progresses performed and emerging trends in the domain of multirate filter banks and multiscale representations of signals and images. Answers to the challenge of handling an increasing demand of information extraction and processing from large data sets will be explored.

Topics (not exclusive)

- Sampling theory, compressive sensing
- Sparse representations
- Multiscale models

- Multiscale processing: interpolation, inpainting, restoration,...
- Wavelet shrinkage and denoising
- Oversampled filter banks, discrete frames
- Rational and non-uniform multirate systems
- Directional, steerable filter banks and wavelets
- Nonlinear filter banks
- (Multidimensional) filter bank design and optimization
- Hybrid analog/digital filter banks
- Fast and low-power schemes (lifting, integer design)
- Multiscale and multirate applications to source and channel coding, equalization, adaptive filtering,...

Important dates

- Deadline for submission: 15 December 2009
- First round of reviews/decisions: 1 April 2010
- Resubmission of revised papers: 1 July 2010

Submission

Guidelines for authors can be found at <http://www.elsevier.com/locate/sigpro>. Authors should submit their manuscripts before the submission deadline via <http://ees.elsevier.com/sigpro/> selecting "Special Issue: Multirate/Multiscale" as Article Type.

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