

Call for Papers

IEEE Journal of Selected Topics in Signal Processing

Special Issue on Differential Geometry in Signal Processing

Traditionally, linear algebra was the forte of the signal processing community, and with good reason; the power of computational devices was limited. The exponential increase in computational power means it is now practical to apply techniques inspired by differential geometry to a range of nonlinear signal processing problems. Grassmann and Stiefel manifolds are particularly relevant to signal processing because they bring a complementary viewpoint to the linear algebraic notions of linear subspaces and orthogonal matrices.

Differential manifolds enter into signal processing because often the most natural formulation of a problem involves a manifold. This may be due to a nonlinear constraint, such as a parameter being confined to the surface of a sphere, or due to requiring a quotient space in order to remove ambiguity (for example, if a channel can be identified only up to an unknown scaling factor then the channel can be thought of as belonging to projective space rather than Euclidean space). Furthermore, it is possible to define stochastic processes evolving on a manifold and hence differential geometry is relevant to both deterministic and stochastic signal processing.

We would like to invite authors to submit their recent and original research results in the general area of differential geometry in signal processing. Authors are encouraged to discuss the topic and style of their proposed papers with the editors in advance to help ensure that the issue as a whole will be coherent and intelligible to the broader signal processing community.

Topics in signal processing are welcome which make use of the following, or related, theories and techniques, as are papers which contribute directly to the theory.

- Quantisation on manifolds
- Optimisation on manifolds
- Filtering, prediction and smoothing of stochastic processes on manifolds
- Parameter estimation on manifolds
- Information geometry
- Geometric algebras

Submission Procedure:

Prospective authors should follow the submission instructions available at <http://mc.manuscriptcentral.com/jstsp-ieee> according to the following timetable.

Manuscript submission due – 15th September 2012

1st review completed – 15th December 2012

Revised manuscript due – 15th January 2013

2nd review completed – 30th March 2013

Final manuscript due – 20th April 2013

Lead guest editor:

Jonathan H. Manton, Electrical and Electronic Engineering, The University of Melbourne, Australia.
(jmanton@unimelb.edu.au)

Guest editors:

David Applebaum, School of Mathematics and Statistics, The University of Sheffield, UK.
(d.applebaum@sheffield.ac.uk)

Shiro Ikeda, Institute of Statistical Mathematics, Tokyo, Japan. (shiro@ism.ac.jp)

Nicolas le Bihan, Grenoble-Image-speech-Signal-Automatics Lab, National Centre for Scientific Research, Grenoble, France. (Nicolas.Le-Bihan@qipsa-lab.grenoble-inp.fr)