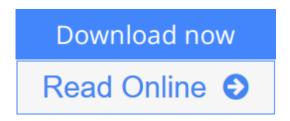# Sparse Image and Signal Processing: Wavelets and Related Geometric Multiscale Analysis

By Jean-Luc Starck, Fionn Murtagh, Jalal Fadili

Sparse Image and Signal Processing: Wavelets and Related Geometric Multiscale Analysis By Jean-Luc Starck, Fionn Murtagh, Jalal Fadili

This thoroughly updated new edition presents state of the art sparse and multiscale image and signal processing. It covers linear multiscale geometric transforms, such as wavelet, ridgelet, or curvelet transforms, and non-linear multiscale transforms based on the median and mathematical morphology operators. Along with an up-to-the-minute description of required computation, it covers the latest results in inverse problem solving and regularization, sparse signal decomposition, blind source separation, in-painting, and compressed sensing. New chapters and sections cover multiscale geometric transforms for three-dimensional data (data cubes), data on the sphere (geo-located data), dictionary learning, and nonnegative matrix factorization. The authors wed theory and practice in examining applications in areas such as astronomy, including recent results from the European Space Agency's Herschel mission, biology, fusion physics, cold dark matter simulation, medical MRI, digital media, and forensics. MATLAB® and IDL code, available online at www.SparseSignalRecipes.info, accompany these methods and all applications.

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Editorial Review

Review
Review of previous edition: 'One of the main virtues of this book is the expert insight that the authors provide into several design and algorithmic choices that one can face when solving practical problems. The authors give some guidance into understanding how sparsity helps in signal and image processing, what some benefits of overcomplete representations are, when to use isotropic wavelets for image processing, why morphological diversity can be helpful, and how to choose between analysis and synthesis priors for regularization in inverse problems.' Michael B. Wakin, IEEE Signal Processing Magazine

Review of previous edition: 'The book's contents are well prepared for graduate-level students or advanced undergraduates who work in the field of image and signal processing or computer science. The book is also an indispensable resource for professionals looking to adopt innovative concepts for improving the performance of image processing.' Yan Gao, Optics and Photonics News

Review of previous edition: 'This is an excellent book devoted to an important domain of contemporary science.' D. Stanomir, Mathematical Reviews

Review of previous edition: 'A welcome addition to the image processing library.' T. Kubota, Computing Reviews

About the Author
Jean-Luc Starck is Senior Scientist at the Institute of Research into the Fundamental Laws of the Universe, Commissariat ... l'énergie atomique, Saclay, France. His research interests include cosmology, weak lensing data, and statistical methods such as wavelets and other sparse representations of data. He has published over 200 papers in astrophysics, cosmology, signal processing, and applied mathematics, and is also author of three books.

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