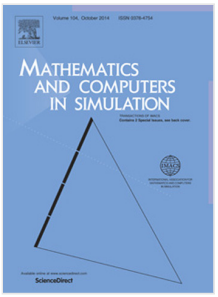
Accepted Manuscript



Denoising strategies for general finite frames

D. De Canditiis, M. Pensky, P.J. Wolfe

PII: S0378-4754(17)30059-9
DOI: http://dx.doi.org/10.1016/j.matcom.2017.02.005
Reference: MATCOM 4436

To appear in: *Mathematics and Computers in Simulation*

Received date: 9 February 2016
Accepted date: 9 February 2017

Please cite this article as: D. De Canditiis, M. Pensky, P.J. Wolfe, Denoising strategies for general finite frames, Math. Comput. Simulation (2017), http://dx.doi.org/10.1016/j.matcom.2017.02.005

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Manuscript
Click here to view linked References

Denoising strategies for general finite frames

D. De Canditiis, M. Pensky and P.J. Wolfe
CNR, Rome Italy; UCF, Orlando USA; UCL, London UK

Abstract

Overcomplete representations such as wavelets and windowed Fourier expansions have become mainstays of modern statistical data analysis. In the present work, in the context of general finite frames, we derive an oracle expression for the mean quadratic risk of a linear diagonal de-noising procedure which immediately yields the optimal linear diagonal estimator. Moreover, we obtain an expression for an unbiased estimator of the risk of any smooth shrinkage rule. This last result motivates a set of practical estimation procedures for general finite frames that can be viewed as the generalization of the classical procedures for orthonormal bases. A simulation study verifies the effectiveness of the proposed procedures with respect to the classical ones and confirms that the correlations induced by frame structure should be explicitly treated to yield an improvement in estimation precision.

Keywords: Finite frames, Block thresholding, Shrinkage, Signal de-noising, SURE

1. Introduction

Regression using more predictors than observations has received a great deal of attention in recent years, from viewpoints as diverse and fundamental as high-dimensional inference and regularization, approximation theory, and sparse coding. While an orthogonal basis yields fast algorithms and classical asymptotic theory, it can often fail to represent a particular function of interest efficiently. As a result, overcomplete representations such as wavelets and windowed Fourier expansions have become mainstays of modern statistics and signal processing.

Such representations are formalized through the theory of frames. Frames can be generated by the action of operators on a template function (mother wavelet or Gabor atom), or be unstructured and random (as in compressive

Download English Version:

https://daneshyari.com/en/article/7543189

Download Persian Version:

https://daneshyari.com/article/7543189

Daneshyari.com