

Laplacian multi-wavelets bases for high-dimensional data and their applications

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Abstract

We introduce a framework for representing functions defined on high-dimensional data. In this framework, we propose to use the eigenvectors of the graph Laplacian to construct a multiresolution analysis on the data, results in a one parameter family of orthogonal bases. We describe the construction of such basis, its properties and derive a bound on the decay rates of the expansion coefficients. In addition, the question of measuring the smoothness of discrete functions is addressed based on a discrete analogue of Besov spaces. We also present a few applications for this family of bases and report an ongoing research related to future applications.

This is a joint work with Yoel Shkolnisky.