Recent Developments in Wavelet and Multiresolution Transforms

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Abstract

In the last decade wavelets have been applied successfully to sound (1D), image (2D), and video (3D) processing. Typical applications include compression, noise reduction, progressive transmission, etc. Each time the data is defined on an Euclidean space and sampled on a regular grid. Applications in computer graphics and visualization, however, need wavelets and multiresolution transforms defined on general geometries (curves, surfaces, manifolds) and wavelets adjusted to irregular sampling. While classical wavelets are only applicable in Euclidean space, we introduce wavelets and multiresolution transforms on complex geometries and their associated linear complexity transforms. We give examples on how to build wavelets for irregular samples, spherical wavelets, and complex triangular meshes.

(No preliminary knowledge of wavelets will be assumed.)