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Multiresolution analysis for 3D scattered data sets

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Abstract

In [1], the authors develop a multiresolution analysis in a one-dimensional context based on Harten's multiscale representation (see e.g. [2, 3]). In the present work we propose to generalize [1] to a three-dimensional context in order to handle with clouds of 3D datasets: we obtain the decomposition and reconstruction algorithms associated to different interpolatory schemes, such as the one considering just function values, or the one considering function and first derivative values. Different interpolatory schemes will lead to consider different interpolatory spaces where to develop the algorithms. As an application of the developed theory, we will consider some examples regarding data compression and discontinuities detection.

Key words: Multiresolution analysis, decomposition-reconstruction algorithms, compression data, discontinuities detection.

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