

Universität Hamburg, Fachbereich Mathematik

AG Ang.Math. (Schwerpunkte „Optimierung und Approximation“ und „Differentialgleichungen und Dynamische Systeme“)

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# Kolloquium über Angewandte Mathematik

Donnerstag, den 23. April 2009, 17 Uhr c.t., Hörsaal 5

Prof. Dr. Carl Rohwer (Bruchsal)\*

## “Generalizing Projections for Nonlinear Multiresolution Analysis“

### Zusammenfassung/Abstract

Projections are used to decompose functions, or sequences, onto subspaces of decreasing dimension recursively. At each such mapping, the additive complement can be considered as a resolution level, spanned by some basis.

In Image Decomposition we are almost forced to use nonlinear decompositions, and lack of theory was crucial. Argueing from various simple heuristic principles, we can demonstrate that generalizations of projections are not only possible, but useful and sufficient to a degree that is surprising. Ultimately a class of Discrete Pulse Transforms are possible, and very useful, particularly for sequences that are intensity values from a row of pixels from an image.

Surprising bonuses are provable: All the components of such a decomposition, consisting of square pulses at different resolution levels (widths), are fully order compatible with the original sequence, and a Parsevaltype Identity is available for analysis, and very appropriate for vision. Lastly, computation is simple, stable and very fast.

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