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Nonlinear approximation with Walsh atoms. (English) [Zbl 0937.65060]


Summary: As a model for nonlinear approximation from a redundant set of time-frequency atoms, we consider approximation in $L^2(\mathbb{R})$ with linear combinations of Walsh atoms. Best approximation can be realized with a fast algorithm when the class of approximants is restricted to linear combinations of pairwise orthogonal atoms. We describe the effect of this restriction on approximation rates, and then discuss the performance of the greedy algorithm. In particular, a uniform geometric rate of convergence is shown to hold for the class of initial functions consisting of linear combinations of two atoms.

For the entire collection see [Zbl 0927.00040].

MSC:

- 65J05 General theory of numerical analysis in abstract spaces
- 41A50 Best approximation, Chebyshev systems
- 41A65 Abstract approximation theory (approximation in normed linear spaces and other abstract spaces)

Keywords:

- Hilbert space; best approximation; nonlinear approximation; time-frequency atoms; Walsh atoms; fast algorithm; greedy algorithm; convergence