Fast Wavelet–Haar–Clifford–Prometheus Transforms

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The goal of time–frequency analysis is to decompose a signal into elementary waveforms, each having a well defined *position, duration,* and *frequency.* For applications like data compression or noise reduction, the decomposition should be realized by a fast, stable, and adaptive algorithm.

The first purpose of this paper is to develop a large library of Wavelet–Haar–like transforms. These wavelet packets are just rescaled versions of generalized Golay–Shapiro–Rademacher sequences of Fourier–Clifford–Prometheus transforms associated with finite Abelian groups. The second purpose is to present a fast algorithm for selecting the best basis among all these bases, given a signal and an additive cost function.