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16. Applications

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Recursive wavelets and image compression
Popular algorithms of compression are based on image decomposition in bases of wavelets with a compact support. These algorithms can be realized with multirate finite impulse response (FIR) filter banks.
C. Herley and M. Vetterli (1993) have introduced Multiresolution Analyses of $L^2(r)$, which are associated with recursive (IIR) filter banks, and studied some orthogonal wavelet bases. We consider general biorthogonal approach to recursive wavelets. We propose wavelet bases, associated with IIR filters, which provide at least the same compression factors as the best of bases with compact supports and have significantly less computational complexity. Here is one of such biorthogonal pair of filters.

$$h(z) = \frac{1+z}{\sqrt{2}}, \quad \tilde{h}(z) = \frac{0.1844z^{-1} + 0.7191 + 0.7191z + 0.1844z^2}{(1+0.1304z^2)(1+0.1304z^{-2})}.$$

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