Regularization in non-linear noise influence environment using wavelet shrinkage

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Wavelet synthesis is a kind of inverse problem: by filtering wavelet coefficients, one is able to construct a good estimator of a pure signal from noisy data. For a simple linear noise influence, Donoho and Johnstone proposed an optimal filter design in the sense of a good reconstruction of the pure signal. We propose a more realistic framework where the influence of the noise is non-linear. In particular, we propose an optimal method to filter the wavelet coefficients of a noisy discrete dynamical system in order to construct a good estimator of the pure signal. Some examples with simple chaotic dynamical systems are presented.