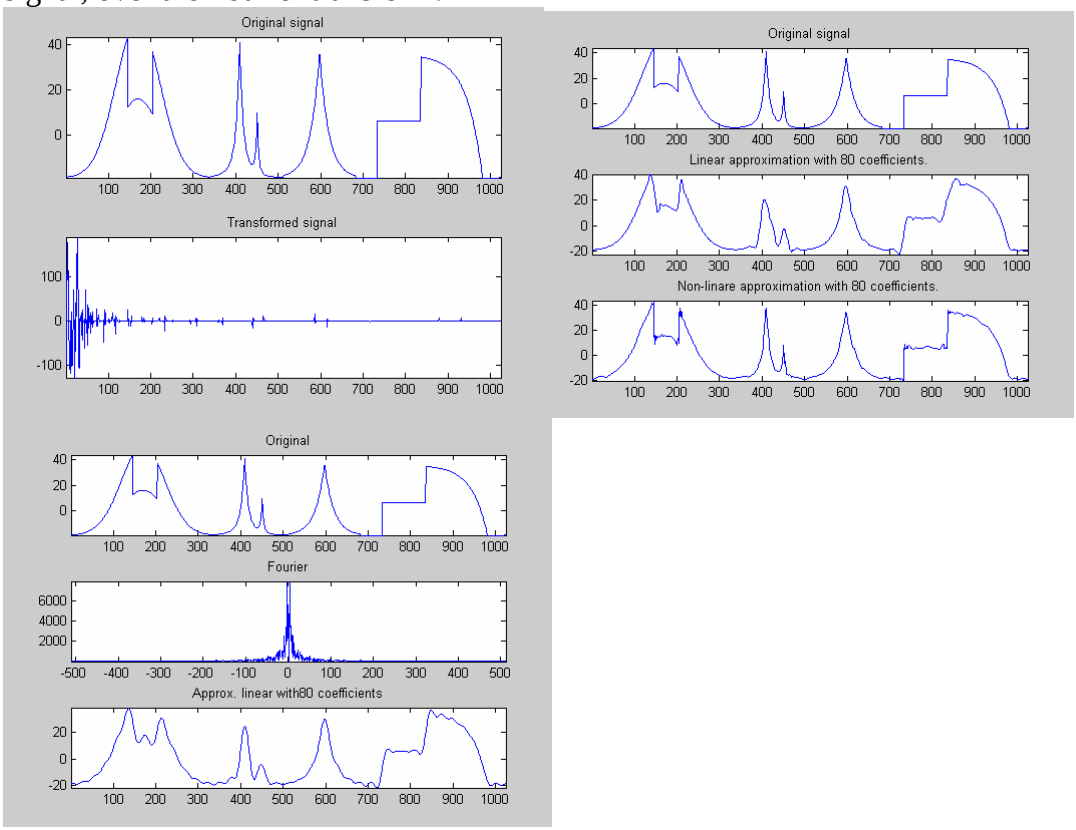
Physics 640
November 6, 2008

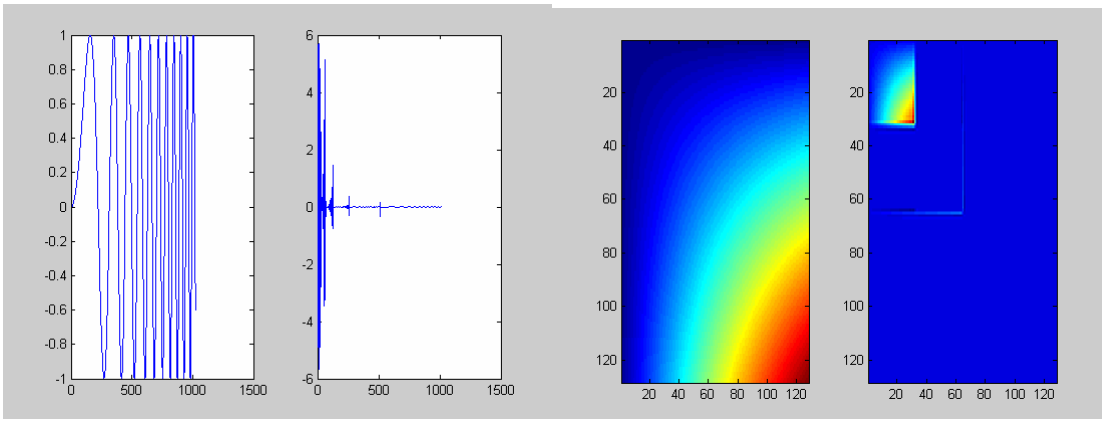
More information on Project 5 Option b):

The latest version of 'perform_wavelet_transform.m' is on the website, please download and use this one. This updated version requires a power of 2 length for 1D and 2D data; and 2D data should also be a square.

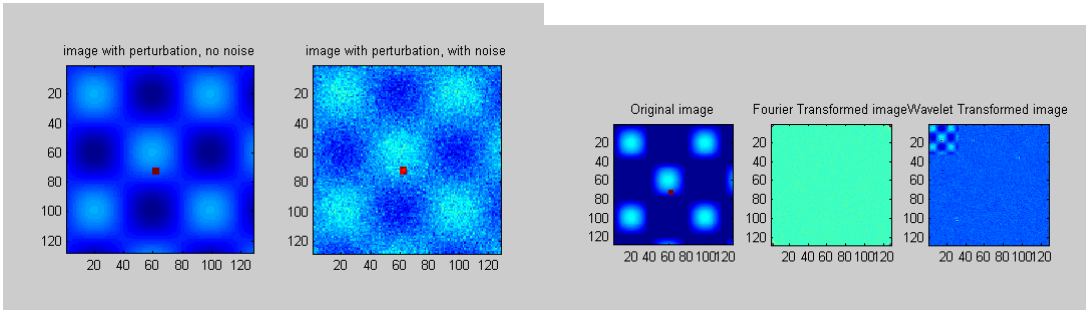
The figures below show the ability of wavelet transform to recover sharp edges in a 1D signal, over the Fourier transform.



These figures below show the signal with its wavelet transforms in 1D (left) and a 2D (right)



Below, figure 1 shows the original 2D signal with a perturbation (square dot), and the same signal with an added noise (30% of the signal amplitude). Figure 4 shows the original signal, the Fourier and wavelet transform of the same signal with added noise. The perturbation (square dot) is not seen in the Fourier transform but yes in the wavelet transform.



Below are the results of noise elimination using the Fourier transform (Fig 3) and the wavelet transform (Fig 5)