Lab. Session n. 3

Ex. 1

Given the wavelets: db2, db4, sym4, coif5

* Get the mother wavelet PSI and basis function PHI;
* Normalize them according to the theory;
* Compute the center frequency and display and the wavelet function and the associated center frequency based approximation.
* Plot the normalized wavelet and scaling function in the Fourier domain (choose Nsamp=1024) and verify that PHY corresponds to a low-pass type function and PSI corresponds to a high-pass type function (normalize the frequency axis);
* Verify that the energy conservation theorem hods.

Ex. 2

* Construct a sinusoidal signal with the following parameters: period T0=0.1 sec, sampling rate Ts=1ms, signal duration T=4096 sec. Plot the signal and its Power Spectral Density (PSD) (note that the PSD is 1/N times the spectrum);
* Add Gaussian noise with mean = 0 and sigma = 1, plot the signal and PDS;
* Construct a low-pass filter with impulse response h[n]=1/15[1,1,…1]. Plot its Fourier transform (spectrum and phases)
* Filter the noisy signal with such a filter and plot the resulting signal.