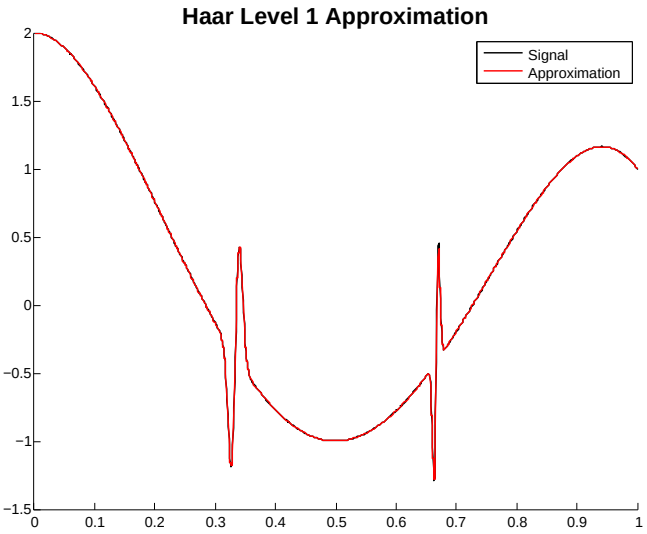
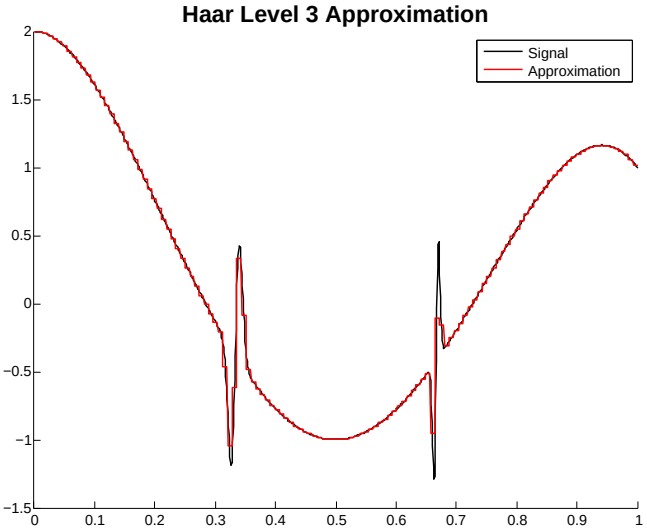
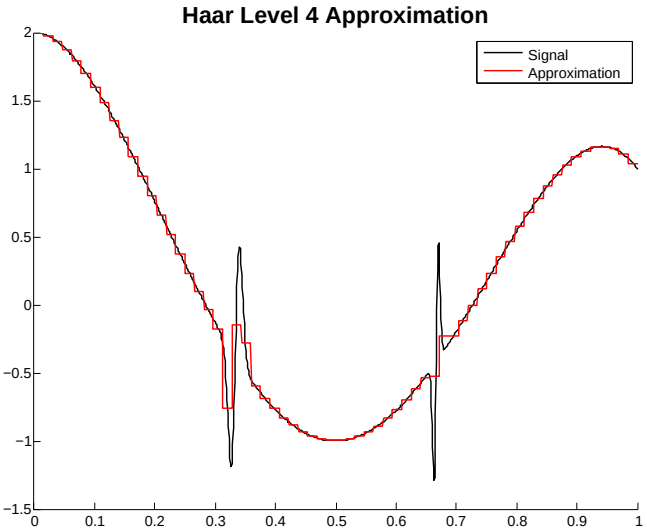
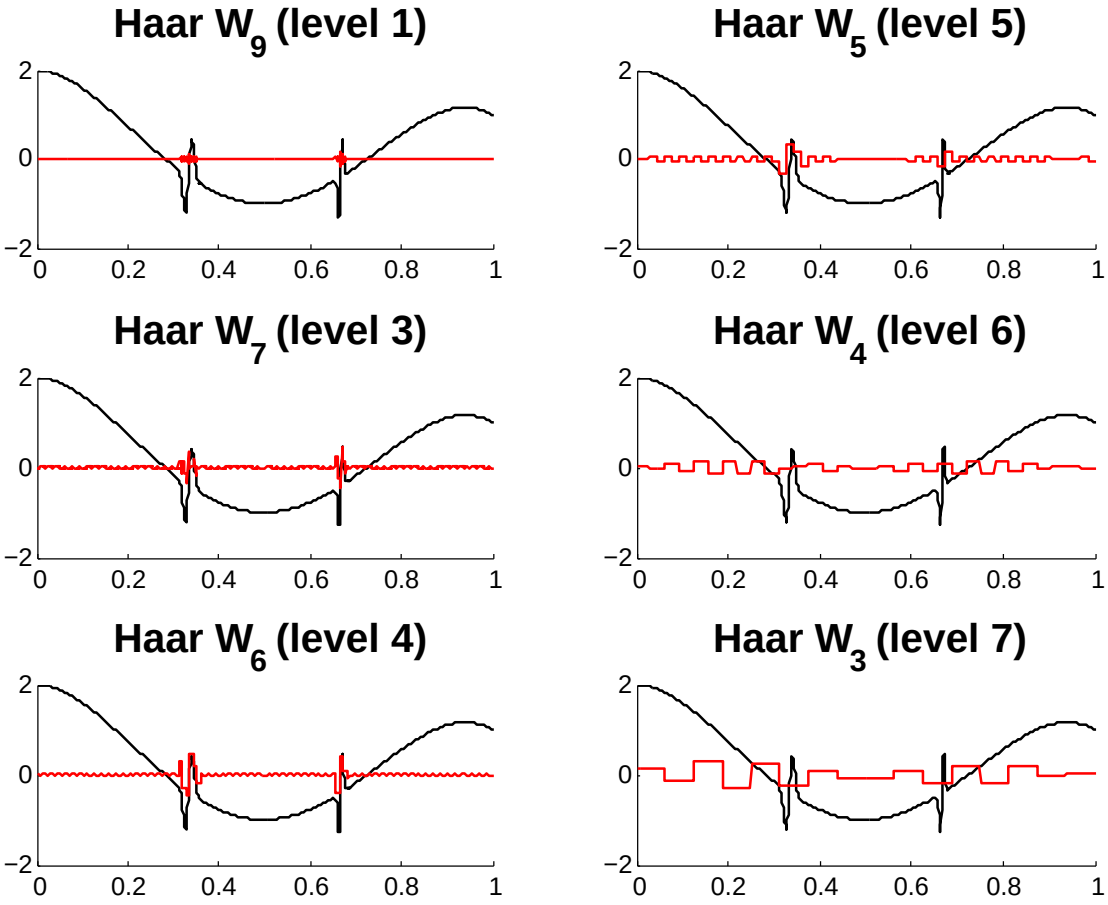
Here are several levels for a signal f. Notice the higher the level, the worse the approximation.



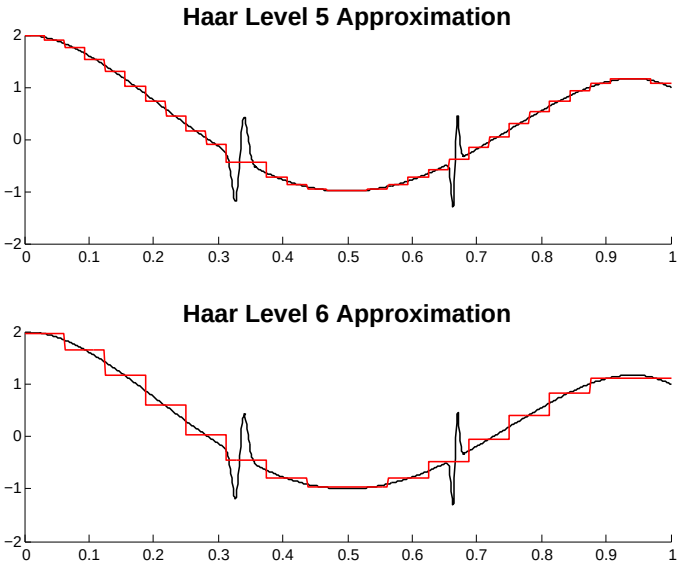




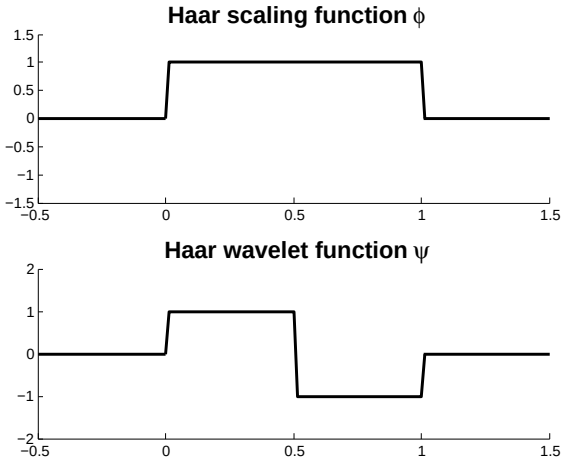
Here are various W_j's:

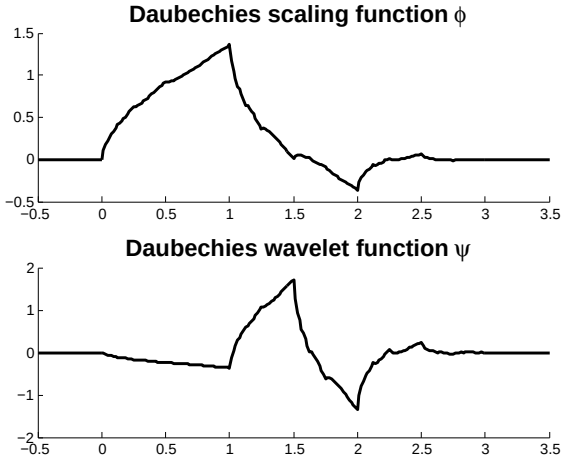


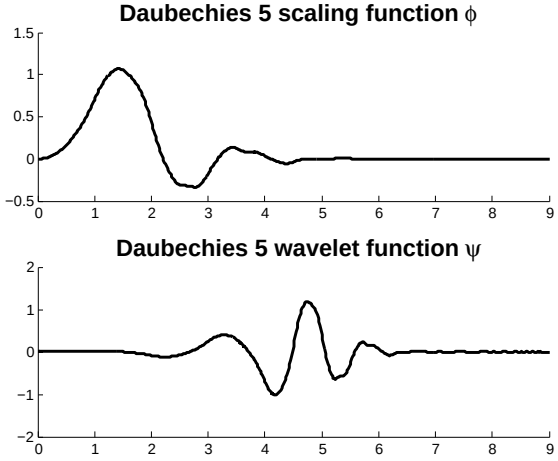
See that levels 6 and 7 seem to miss the spikes, so we'll throw out W_9 to W_5 (for level 6) or W_9 to W_4 (for level 7). In other words, we'll use the level 5 or 6 to filter out the noise:



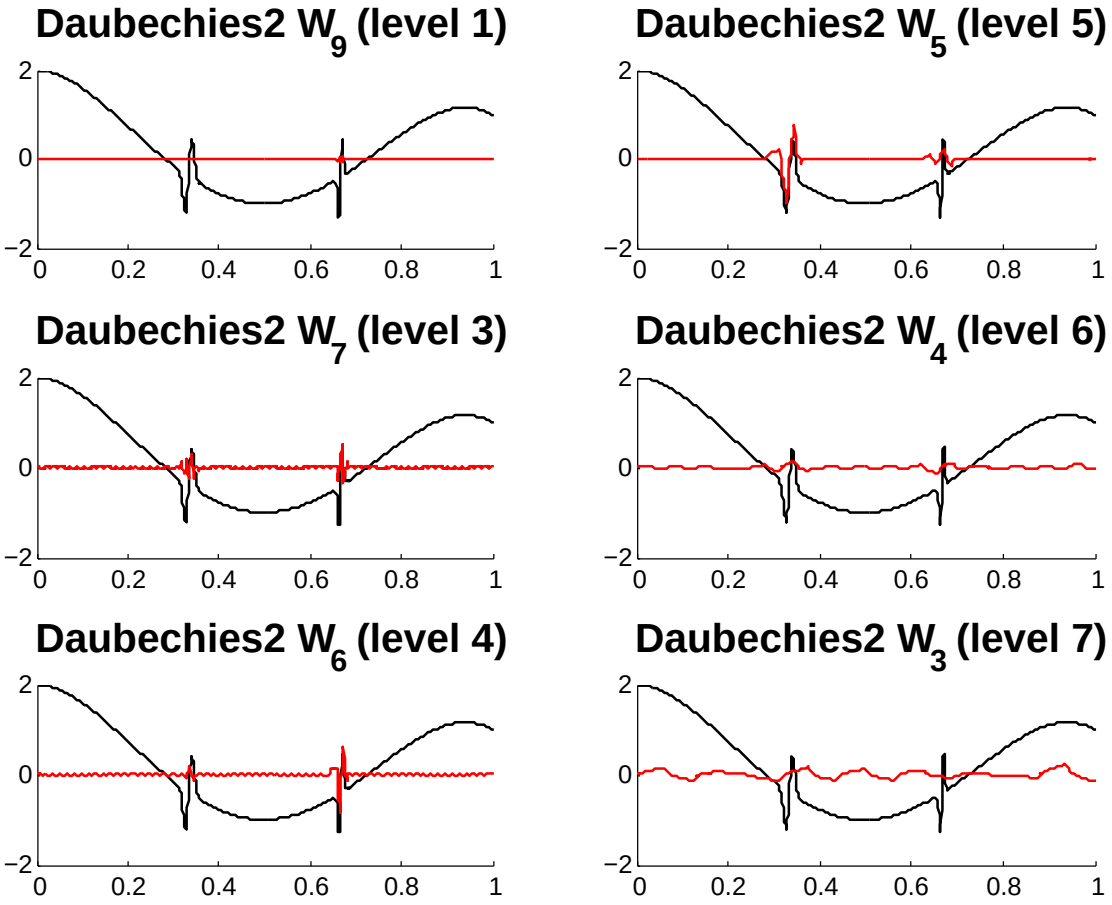
Here are some of the wavelet families:



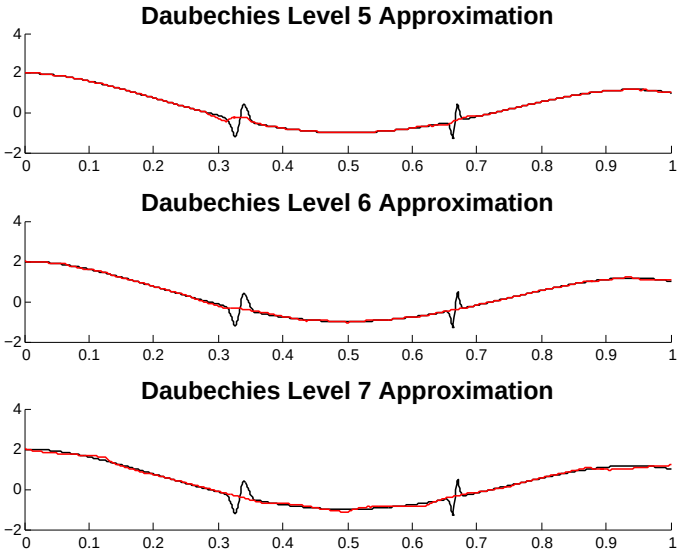


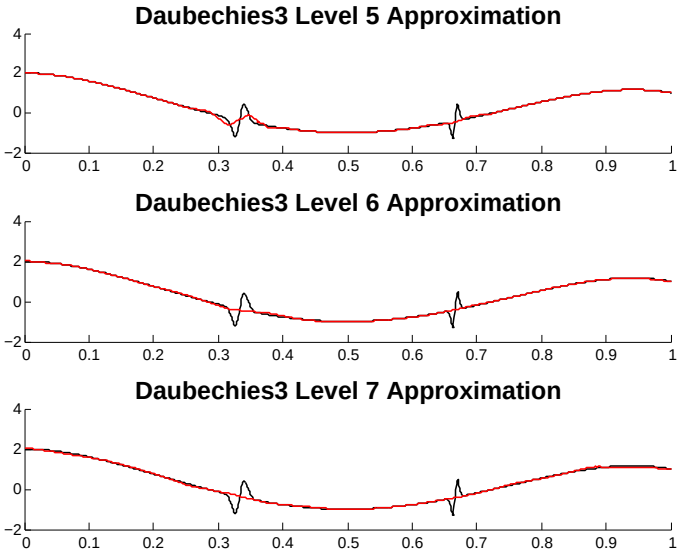


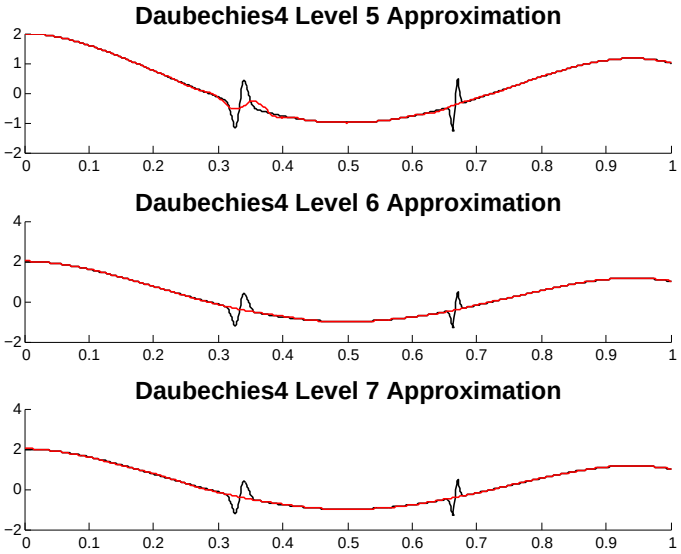
Let's filter the previous example using other Daubechies wavelets: Here are various W_j's:



See that levels 6 and 7 seem to miss the spikes, so we'll throw out W_9 to W_5 (for level 6) or W_9 to W_4 (for level 7). In other words, we'll use the level 5 or 6 to filter out the noise:

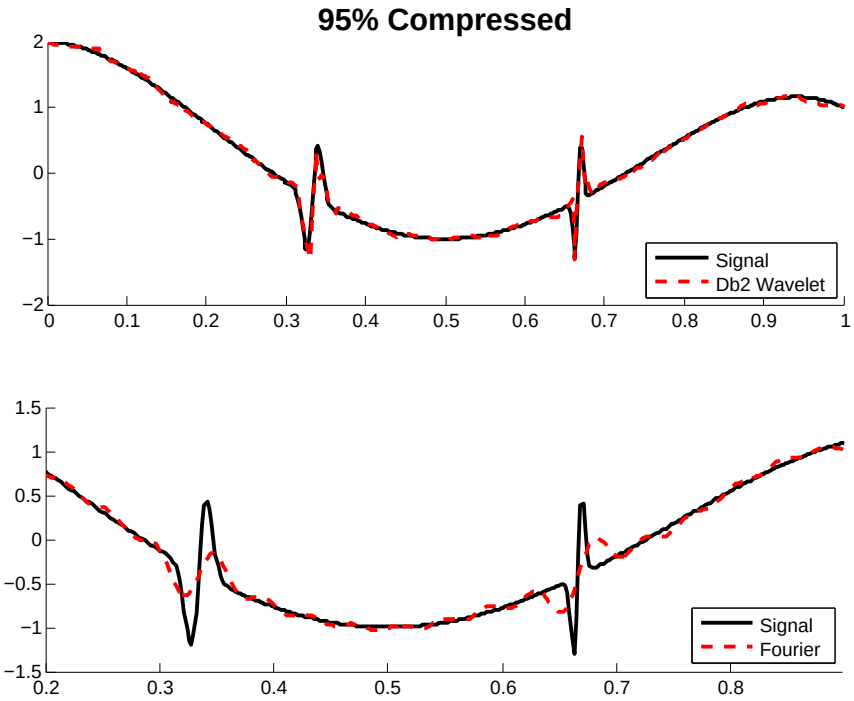


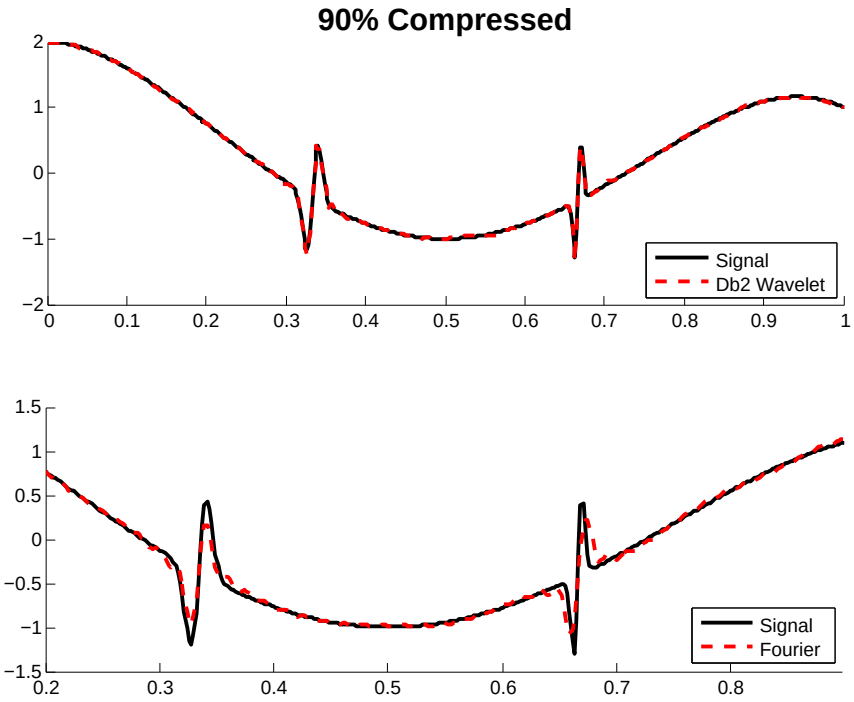


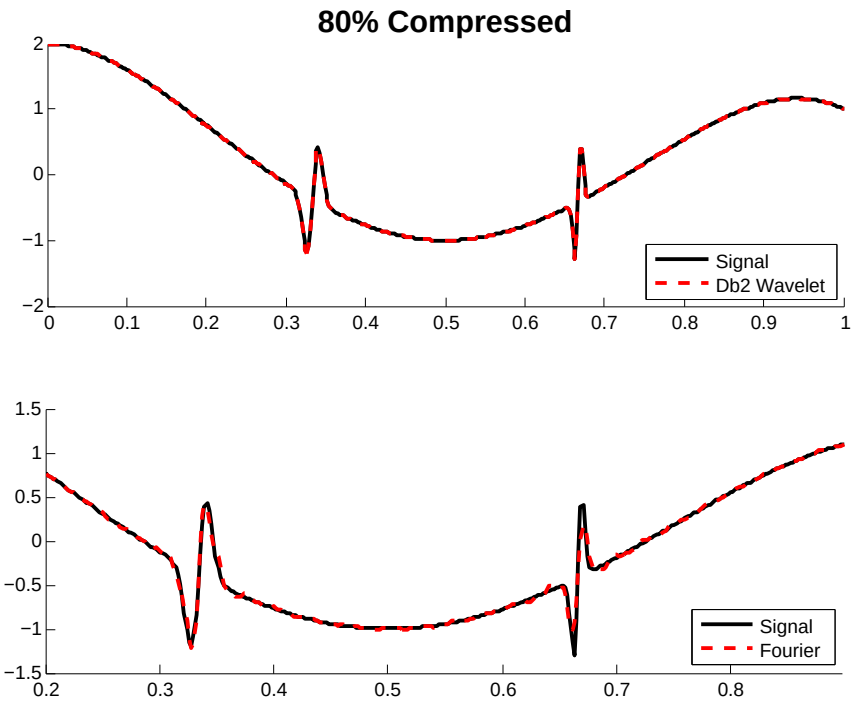


It looks like level 6 is the best for all the families and db4 does a great job of filtering out the noise.

Let's compare various compression rates of Fourier analysis versus db2 wavelets.






80% Compressed
2
1
0
−1
−2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Signal
Db2 Wavelet

1.5
1
0.5
0
−0.5
−1
−1.5
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Signal
Fourier