Applied Algebra Worksheet Prep for Lecture 13

Consider the following scheme to make a wavelet. Given a signal x on $2m = N$ sample points, define the trend t and detail d to be:

$$t[k] = \tfrac{1}{4}x[2k] + \tfrac{3}{4}x[2k+1]$$

$$d[k] = t[k] - x[2k+1]$$

Problems:

- Write down the wavelet analysis matrix in the case $m = 1, N = 2$
- Find its inverse, T_s, the wavelet synthesis matrix

The two columns of T_s are our new basic wavelets: the first one is the trend wavelet w and the second is the detail wavelet w'.

Now, let's ask how these compare to the Haar Wavelets.

More Problems:

- Is the sum of the coeffs of w positive?
- Is the sum of the coeffs of w' zero?
- Are the sum of the squares of the coeffs of both of these the same?
- Are they orthogonal?
- How might these be better or worse than Haar wavelets from a practical point of view?