## Haar transform for signal of length 8.

We can consider the signal a vector in and transform all the basis vectors:

Signal = 1,0,0,0,0,0,0,0 Transform =



Signal = 0,1,0,0,0,0,0,0 Transform =



Signal = 0,0,1,0,0,0,0,0 Transform =



Signal = 0,0,0,1,0,0,0,0 Transform =



Signal = 0,0,0,0,1,0,0,0 Transform =



Signal = 0,0,0,0,0,1,0,0 Transform =



Signal = 0,0,0,0,0,0,1,0 Transform =



Signal = 0,0,0,0,0,0,0,1 Transform =



So we obtain the analysis matrix for a three scale transform:

Thereby the columns of the matrix are the transformed basis vectors .

Note that Signal = 0,0,0,0,0,1,0,0 and Signal = 0,1,0,0,0,0,0,0 are “the same”, just delayed in time, but the transforms are very different: That’s why wavelets can localize events in time (in contrast to the Fourier Transform).