Here are several levels for a signal $f$. Notice the higher the level, the worse the approximation.
Here are various $W_j$'s:

![Haar W_9 (level 1)](image)

![Haar W_5 (level 5)](image)

![Haar W_7 (level 3)](image)

![Haar W_4 (level 6)](image)

![Haar W_6 (level 4)](image)

![Haar W_3 (level 7)](image)

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:

![Haar Level 5 Approximation](image)

![Haar Level 6 Approximation](image)
Here are some of the wavelet families:

- **Haar scaling function $\phi$**

- **Haar wavelet function $\psi$**

- **Daubechies scaling function $\phi$**

- **Daubechies wavelet function $\psi$**

- **Daubechies 5 scaling function $\phi$**

- **Daubechies 5 wavelet function $\psi$**
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

Signal

Db2 Wavelet

Fourier