

Homework 5

1. What is the “consistent-principle” in a PFFS and what’s the meaning of the consistent principle? What is the condition for which a PFFS yields the consistent principle?
2. Let H and H^0 be a pair of linear phase symmetrical biorthogonal filter-bank filters. As we know, PFFS-dual of H is given by $\tilde{H} = H^0 + \Delta H$. Explain why we can always add to \tilde{H} one additional zero (than that of H^0) at $\gamma = 1/2$ (and thereby increase the order of vanishing moment of the associated wavelet $\tilde{\psi}$ by one).
3. Let $H = H^0$ be the Haar wavelet filters. Find a PFFS-dual \tilde{H} of H with 3 zeros at $\gamma = 1/2$ using the PFFS approach. You do not have to find the time sequence of the new filter. The frequency domain expression is enough. [Hint: Based on the example we did in case, and add an appropriate ΔH term with 2 zeros at $\gamma = 1/2$].