

Homework No. 4

Due: Wednesday, January 27, 2010, in class

14.7 Consider the analysis–synthesis filter bank of Figure P14.3. Develop the input–output relation of this structure in the z -domain. Let $H_0(z) = (1 + z^{-1})/2$ and $H_1(z) = (1 - z^{-1})/2$. Determine the synthesis filters $G_0(z)$ and $G_1(z)$ so that the structure of Figure P14.3 is a perfect reconstruction filter bank.

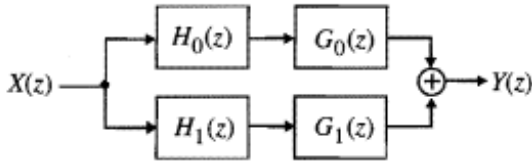


Figure P14.3

14.17 The four filters of the two-channel QMF bank are given by $H_0(z) = 3z^{-2}$, $H_1(z) = 2$, $G_0(z) = 1.5z^{-1}$, and $G_1(z) = 4z^{-1}$. Show that the QMF bank is a perfect reconstruction system.