5.2(a) $G(z) = \dfrac{k_3 z^{-1} + k_4 z^{-2}}{1 - k_1 z^{-1} - k_2 z^{-2}}$ (Direct Form I)

$\therefore H(z) = \dfrac{1}{1 - G(z)} = \dfrac{1 - k_1 z^{-1} - k_2 z^{-2}}{1 - (k_1 + k_3) z^{-1} - (k_2 + k_4) z^{-2}}$

(b) $|\alpha_2| = |k_2 + k_4| < 1$ (5.3.6)

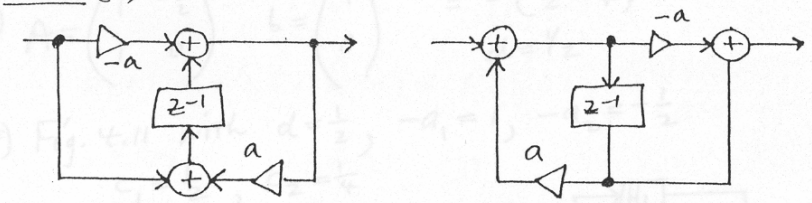
$|\alpha_1| = |k_1 + k_3| < 1 + \alpha_2 = 1 - k_2 - k_4$ (5.3.7)

(c) see Fig. P4.6

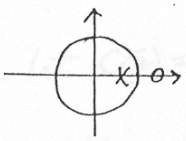
5.8 $H(z) = \dfrac{1 + a z^{-1}}{1 - a z^{-1}} = -1 + \dfrac{2}{1 - a z^{-1}}$

$\therefore h(n) = -\delta(n) + 2 a^n u(n)$

5.13 (a)



(b)



Note: $H(1) = 1$, $H(-1) = -1$