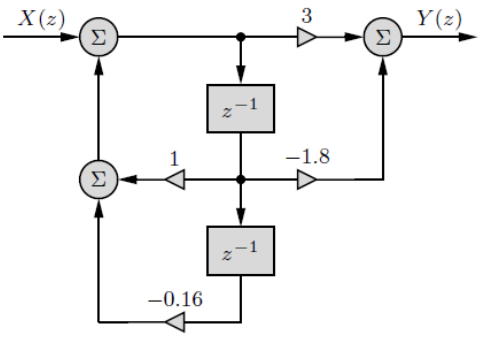
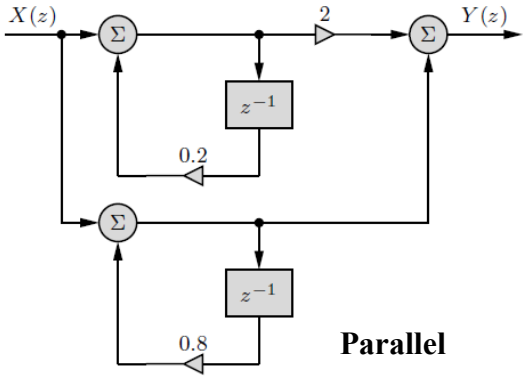
Answer Keys to HW 10

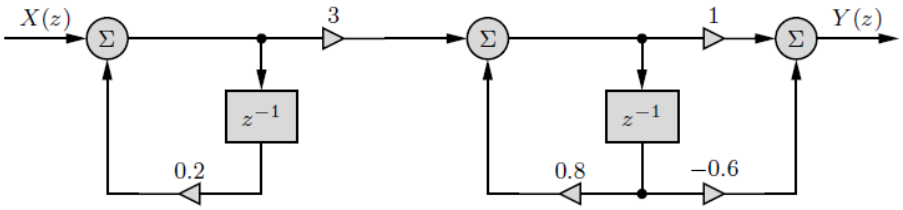
1)



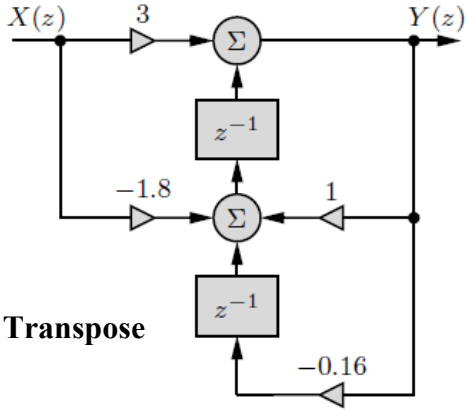
Direct Form II



Parallel



Cascade



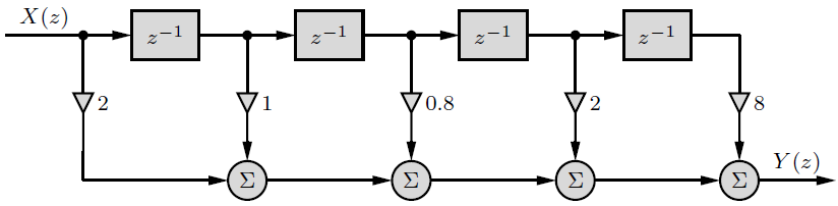
b) Transpose

2) a) $$y_{\text{zsr,a}}[n] = [0.4856(e)^n - 0.4170(0.8)^n - 0.0685(-0.2)^n]\,u[n]$$

b) $$y_{\text{zsr,b}}[n] = \frac{25}{33}(2)^n u[-n-1] + \left[\frac{2}{3}(0.8)^n + \frac{1}{11}(-0.2)^n\right] u[n]$$

c) $$y_{\text{zsr,c}}[n] = \frac{25}{33}(2)^n u[-n-1] + [0.4856(e)^n + 0.2496(0.8)^n + 0.0224(-0.2)^n]\,u[n]$$

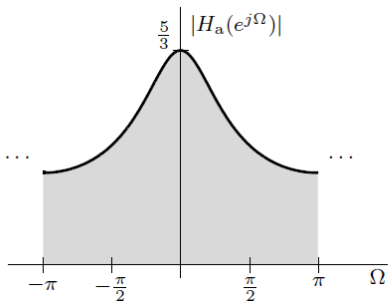
3)

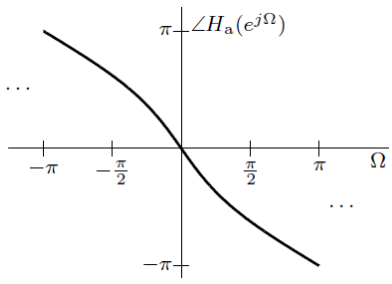


4)

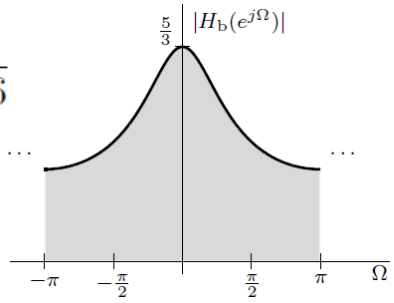
$$H_{\text{a}}(z) = \frac{1}{z - 0.4}$$

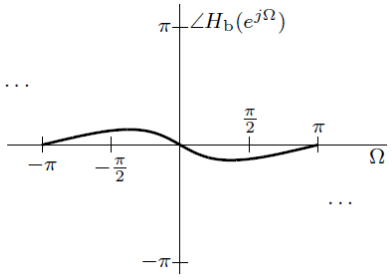
$$H_{\text{b}}(z) = \frac{1}{1 - 0.4z^{-1}}$$

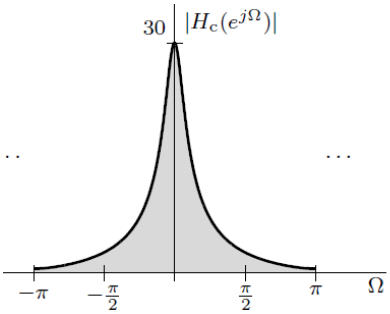


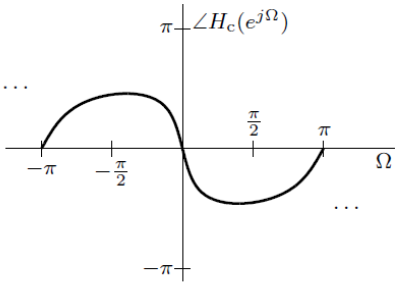


$$H_c(z) = \frac{3z^2 + 1.8z}{z^2 - z + 0.16}$$

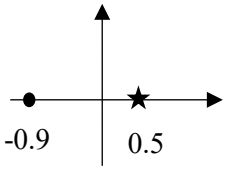




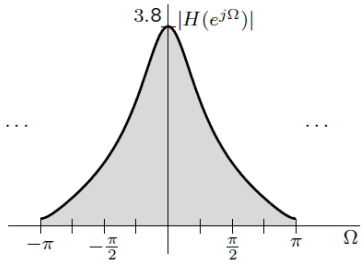




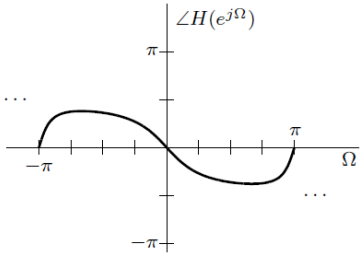
5) a) $H(z) = \dfrac{z + 0.9}{z - 0.5}$



b) $H(\Omega) = \dfrac{e^{j\Omega} + 0.9}{e^{j\Omega} - 0.5}$



c) $y[n] = 3.8 + 1.25\cos(0.5\pi n - 2.24)$



6)

$$\Omega_c = \frac{\pi}{4}$$

$$H(z) = K\frac{(z - e^{j\pi/4})(z - e^{-j\pi/4})}{(z - |\gamma|e^{j\pi/4})(z - |\gamma|e^{-j\pi/4})}$$