

**2.35** Consider the following linear discrete-time system.

$$H(z) = \frac{5z^{-2} + 4.5z^{-4}}{1 - 1.8z^{-2} + 0.81z^{-4}}$$

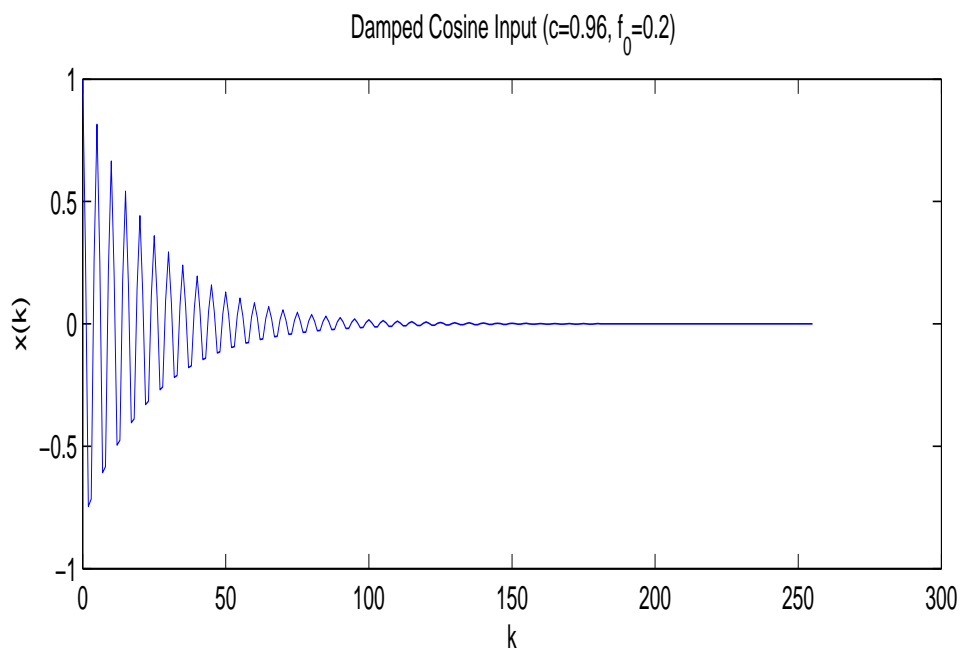
Use GUI module *g\_system* to plot the following input and the zero-state response to it.

$$x(k) = (0.96)^k \cos(0.4\pi k)$$

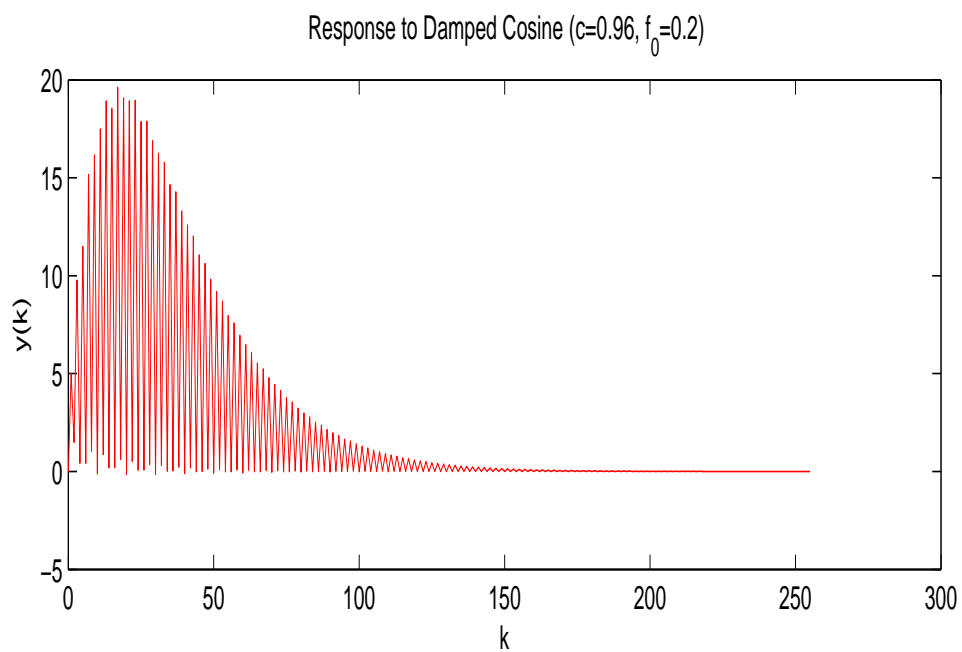
### **Solution**

From inspection of the difference equation, the transfer function is

$$H(z) = \frac{10z^{-1} + 5z^{-2}}{1 - 0.6z^{-1} - 0.16z^{-2}}$$



**Damped Cosine Input:**  $x(k) = (0.96)^k \cos(0.4\pi k)$



**Zero-State Response**