B–10–15. Using the pole-placement-with-observer approach, design observer controllers (one with a full-order observer and the other with a minimum-order observer) for the system shown in Figure 10–60. The desired closed-loop poles for the pole-placement part are

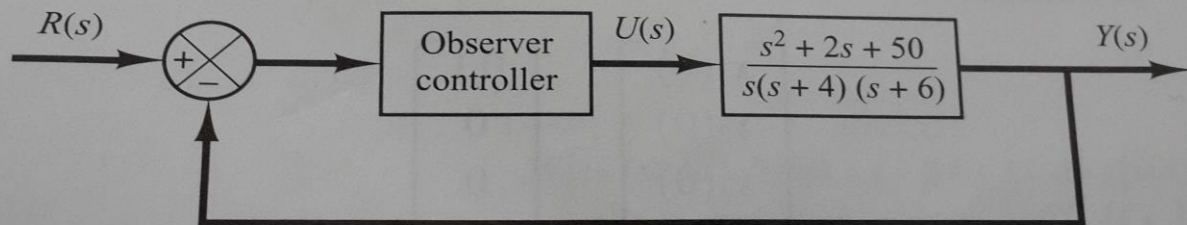$$s = -1 + j2, \qquad s = -1 - j2, \qquad s = -5$$

R(s), Observer controller, U(s), $\dfrac{s^2 + 2s + 50}{s(s + 4)(s + 6)}$, Y(s)

Figure 10–60
Control system with observer controller in the feedforward path.

system. Using the design an observer

es for the pole-

71 – j0.7071

observer, choose

The desired observer poles are

$$s = -10, \quad s = -10, \quad s = -10 \quad \text{for the full-order observer}$$

$$s = -10, \quad s = -10 \quad \text{for the minimum-order observer.}$$

Compare the unit-step responses of the designed systems. Compare also the bandwidths of both systems.

B–10–16. Using the pole-placement-with-observer approach, design the control systems shown in Figures 10–61(a) and (b). Assume that the desired closed-loop poles for the pole placement are located at

$$s = -2 + j2, \qquad s = -2 - j2$$

and the desired observer poles are located at