Stability and Accuracy of Automatic Control Systems

Ex. 1.

Determine the steady-state error of a closed-loop feedback control system with a proportional (P), proportional–derivative (PD), and proportional–integral (PI) controller, and a controlled object with transfer function $G(s) = \frac{1}{(Ts+1)^3}$, under a unit step input.

Ex. 2.

Determine the (K_p, T) region of asymptotic stability for a closed-loop feedback control system with a proportional (P) controller K_p and a controlled object with transfer function $G(s) = \frac{1}{(Ts+1)^3}$. Use the Hurwitz criterion, the Nyquist criterion, and the root (pole) location method.

Ex. 3.

Determine the K_p interval of asymptotic stability for a closed-loop feedback control system with a proportional (P) controller K_p and a controlled object with transfer function $G(s) = \frac{1}{(s+1)(2s+1)(3s+1)}$. Use the Hurwitz criterion, the Nyquist criterion, and the root (pole) location method.

Ex. 4.

Determine the K interval of asymptotic stability for the system with transfer function $G(s) = \frac{2}{Ks^3+3s^2+2s+K+2}$. Use the Hurwitz criterion and the root (pole) location method.

Ex. 5.

Determine the K intervals of asymptotic and marginal stability for the system with transfer function $G(s) = \frac{2}{Ks^3+4s^2+2s+K+2}$. Use the Hurwitz criterion and the root (pole) location method.