B-7-24, B-7-27, B-7-28

1. The open-loop transfer function of a unity-feedback system is as follows.

$$G(s) = \frac{16}{s\left(s + 4\sqrt{2}\right)}$$

Evaluate M_p, t_s, t_p, ω_c, M_r, ω_r, ω_b, γ, and K_g.

2. The open-loop transfer function of a unity-feedback system is as follows.

$$G(s) = \frac{K}{s(s+1)(0.1s+1)}$$

1). Determine the value of K such that $20\lg K_g = 20\,\text{dB}$;

2). Determine the value of K such that $\gamma = 60^0$.

3. The open-loop transfer functions of unity-feedback systems are as follows.

① $G(s) = \dfrac{\alpha s + 1}{s^2}$

Determine the value of α such that the phase margin $\gamma = 45^0$.

② $G(s) = \dfrac{K}{(0.01s+1)^3}$

Determine the value of K such that the phase margin $\gamma = 45^0$.

4. A Nyquist curve of an open-loop transfer function is shown below with open-loop gain $K = 500, p = 0$, where p is the number of the unstable poles of the open loop transfer function. Determine the range of K for which the system is stable.

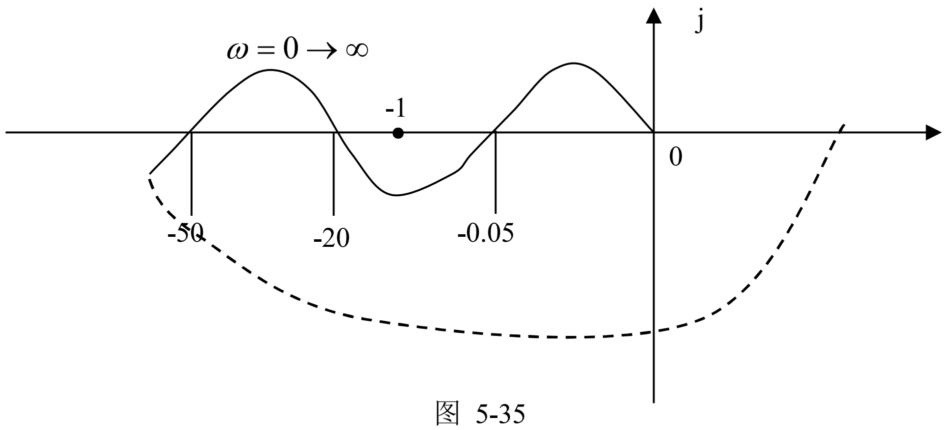

图 5-35