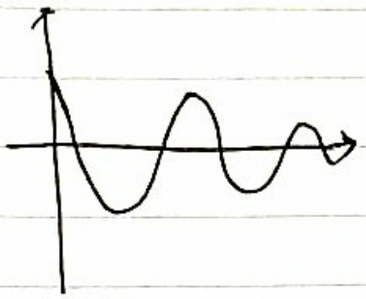
练习12.1

(1) $\omega_0 = \frac{1}{\sqrt{LC}} = 10^7\,Hz$

$\alpha = \frac{1}{2RC} = \frac{1}{3}\times 10^7\,Hz$

$\because \alpha < \omega_0 \therefore$ 欠阻尼

(2)



(3) 图示二阶网络衰减的包络线与前图电路的纵坐标为 $\frac{\omega_0}{\omega_0}$ 倍

练习12.4

$\alpha = \frac{R_1+R_2}{2L} = 1.5\times 10^7\,Hz \qquad \omega_0 = \frac{1}{\sqrt{LC}} = 2\times 10^7\,Hz.$

$\because \omega_0 < \alpha$, 故为过阻尼

练习12.8

(a) 特征方程: $\frac{1}{RC}\frac{dv}{dt} + \frac{d^2v}{dt^2} + \frac{R}{L}v = 0$

$s^2 + \frac{1}{RC}s + \frac{1}{CL} = 0$

$\therefore \alpha = \frac{1}{2RC} \qquad \omega_0 = \frac{1}{\sqrt{CL}}$

(b) $\omega_0 = \frac{1}{\sqrt{LC}} \qquad \alpha = \frac{R}{2L}.$

问题12.6

(1) $t \le 0$ 时 $i_L = 0,\ v_C = 2V$

$t \ge 0$ 时 $\frac{d^2v}{dt^2} + \frac{1}{LC}v = 0$

$\omega_0 = \frac{1}{\sqrt{LC}} = 10$

$v_C(t) = 2\cos 10t$

$i_L(t) = 2\sin 10t$