

(A2-4).

$$\therefore f(t) = 5e^{-10t}.$$

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$$\therefore F(s) = \frac{5}{s+10}; \quad F(j\omega) = \frac{5}{j\omega+10}.$$

$$\therefore |F(j\omega_m)| = \frac{5}{\sqrt{\omega_m^2+10^2}} \approx 0.05$$

$$|F(0)| = \frac{5}{10}.$$

$$\therefore \frac{5}{\sqrt{\omega_m^2+10^2}} = 0.05 \times \frac{5}{10} = 0.025 \Rightarrow 0.025^2 \cdot (\omega_m^2+10^2) = 25.$$

$$\therefore \omega_m^2 = 29900, \quad \omega_m > 0 \Rightarrow \omega_m = 199.75$$

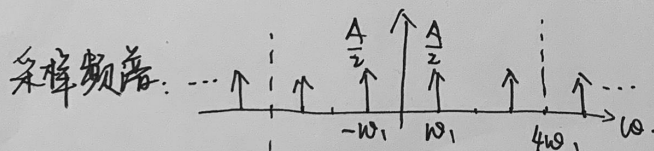
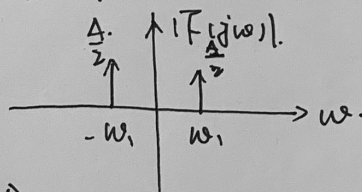
$$\therefore \omega_s > 2\omega_m = 399.5$$

(A2-5).

$$x = A \cos(\omega_1 t), \quad \omega_s = 4\omega_1 / 1.5\omega_1.$$

①.  $\omega_s = 4\omega_1.$

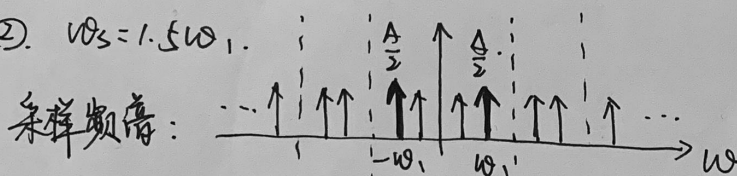
x频谱:



$$\therefore \omega_s > 2\omega_1.$$

$\therefore$  通过理想滤波器后, 可不失真恢复.

②.  $\omega_s = 1.5\omega_1.$



$$\therefore \omega_s \leq 2\omega_1, \text{ 采样频谱相互重叠.}$$

$\therefore$  通过理想滤波器后, 只保留低频信号:

