



t₁ 解: $\Delta f \leq 10 \text{ Hz}$, $f_s = 10000 \text{ Hz}$

由 $\Delta f = \frac{f_s}{L}$, 得 $L = 1000$

即到 0.1s

由采样定理的要求, $f \leq 5000 \text{ Hz}$

t₂ 解: 1) $128 \cdot \frac{1}{40 \text{ kHz}} = 3.2 \times 10^{-3} \text{ s}$

(2) $K_1 = \frac{5 \text{ kHz}}{40 \text{ kHz}} \cdot 128 = 16$

$K_2 = 128 - K_1 = 112$

t₃ 解: 10ms 内共采样 $L = 100$ 次

要能区分, 则 DFT 频谱中 f_2 左右的峰需

距 f_1 和 f_3 各至少 $\frac{2\pi}{L}$ 远

$$(f_{2 \min} - f_1) \cdot \frac{2\pi}{10 \text{ kHz}} = \frac{2\pi}{L}$$

$$(f_3 - f_{2 \max}) \cdot \frac{2\pi}{10 \text{ kHz}} = \frac{2\pi}{L}$$

$\therefore f_2 \in [1.1 \text{ kHz}, 1.9 \text{ kHz}]$

