7.4. (a). 可能. φ: 270°~0
f: 0 ~ ∞. 可以找到 $\varphi=180°$ 的频率.

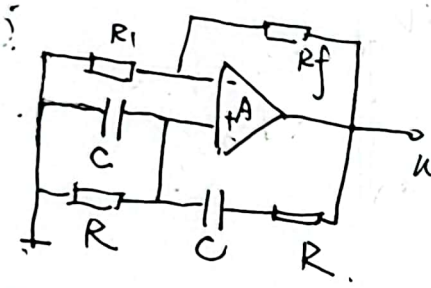
(b). 可能. φ: 0~-270°
f: 0 ~ ∞. 可以找到 $\varphi=-180°$ 的频率.

7.5 (1). 不能. 因为(a)在相移在180°时都没频率为0. 而在相移为180°时信号频率无穷大. 不能产生正弦波振荡.

(2). 可能. (a) φ: 360°~0.
f 0 ~ ∞

(b) φ: 0 ~ -360°
f: 0 ~ ∞.
可以找到 $\varphi=\pm180°$ 的频率.
可能振荡.

7.8.



RC桥式正弦波振荡电路.

(2). 开环. $A\to\infty$. 超过输出电压限幅.

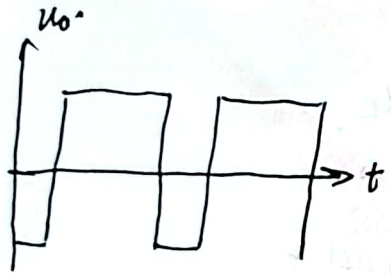
(3). $u_o=u_i$. $|A|=1$. 不满足幅值条件 不振荡. $u_o=0$.

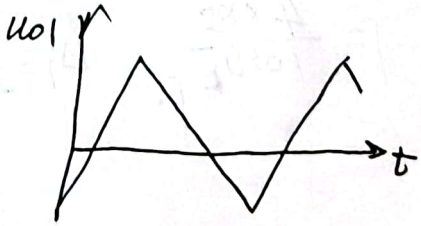
(4). $|A|=1$. 不满足相位条件. 不振荡. $u_o=0$

(5). 开环. $A\to\infty$. 超过输出电压限幅.

7.23.

(1).





(2).

$\frac{U_T}{R_F}=\frac{u_o}{R_5}\rightarrow \pm U_T=\pm U_Z=\pm 8V$

积分电路. $u_{o1}=-\frac{u_I}{R_1C}t+u_{o1}(0)$.

$-U_T=-\frac{1}{R_1C}u_I T+U_T$.

$f=\frac{1}{T}=\frac{u_I}{2U_T R_1 C}=62.5u_I$.

7.24.

(1). A1为积分电路.

$\frac{u_P}{R_4} = \frac{u_I - u_{P1}}{R_3}$. $u_P = u_{N1} = \frac{u_I}{3}$.

导通: $i_C = \frac{-u_{N1}}{R_2} = -\frac{u_I}{3R_2}$.

$u_{O1} = \frac{1}{R_2 C} \cdot u_N (t_1 - t_0) + u_{O1}(t_0)$

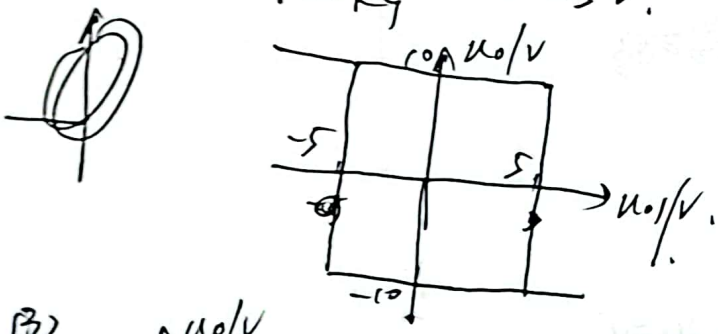
$= \frac{10^3}{15} \cdot \frac{u_I}{3} (t_1 - t_0) + u_{O1}(t_0)$

截止. $i_C = \frac{u_I - u_{N1}}{R_1 + R_2} = \frac{u_I}{3R_2}$.

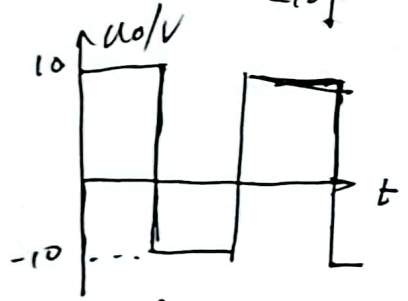
$u_{O1} = -\frac{10^3}{45} \cdot u_I (t_1 - t_0) + u_{O1}(t_0)$

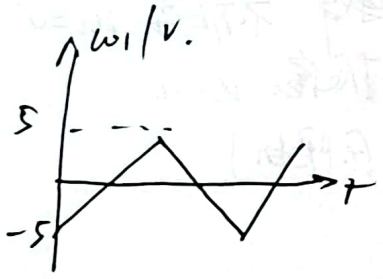
(2). A2为滞回比较器. $\frac{u_P}{R_6} = \frac{u_O - u_P}{R_7}$. $u_O = \pm U_Z = \pm 10\,V$.

$\pm U_T = \frac{\pm R_6}{R_6 + R_7} U_Z = \pm 5\,V$.



(3).





(4). $U_T = \frac{10^3}{45} \cdot u_I \cdot \frac{T}{2} + (-U_T)$ $T = \frac{4 \times 10^3}{10^3 u_I}$. $U_T = \frac{1}{2} u_I$.

$\rightarrow f = \frac{1}{T} = \frac{1}{0.9} u_I \approx 1.11 u_I$.

7.25.