

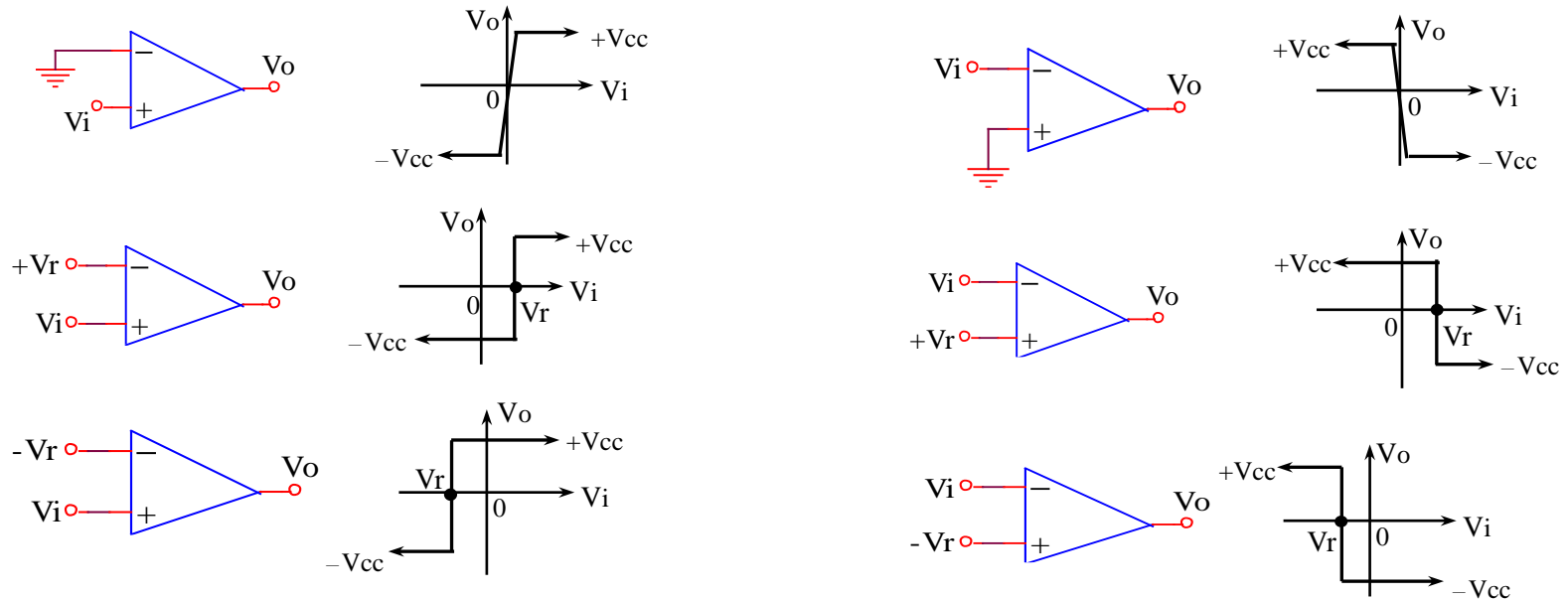
比較器與樞密特

一、比較器(無回授)

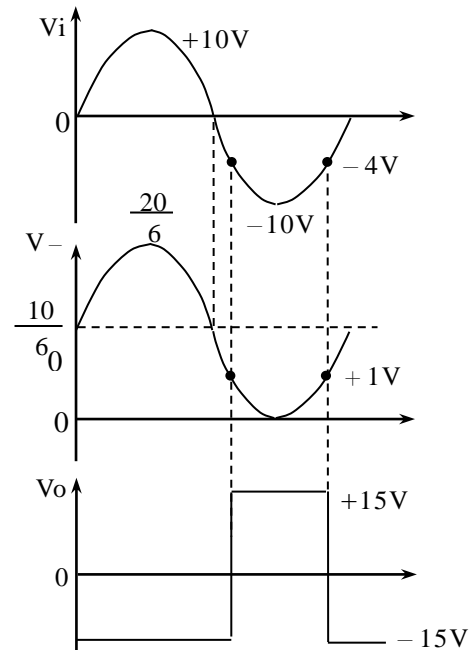
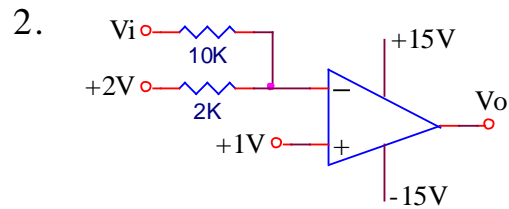
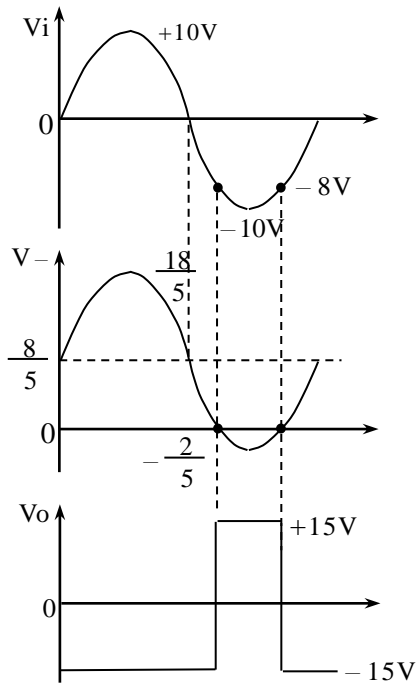
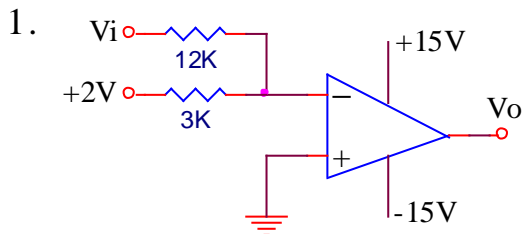
內部相比：1.誰大誰輸出(正或負 V_{cc})

2.大小相同、極性相反，輸出 = 0

3.大小相同、極性相同，二者均為正時輸出 $+V_{cc}$ ，均為負時輸出 $-V_{cc}$



二、比較器範例($V_i = 10 \sin \omega t$)



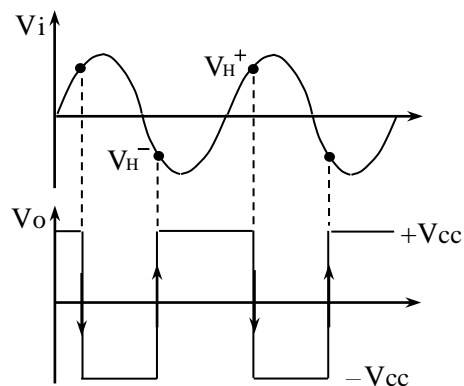
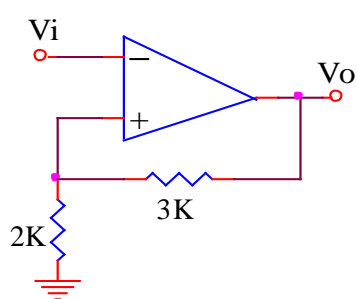
三、反相樞密特(不論反相或同相樞密特，其 V_{H^+} 恆大於 V_{H^-})

1. 正回授

2. 有兩個比較(臨界)點

3. V_o 與 V_i 不會同時為零

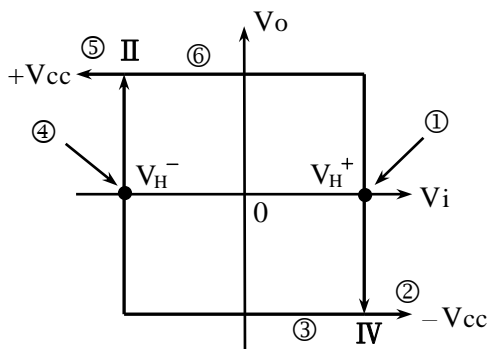
(設 $V_{cc} = \pm 15V$)



$$V_+ = \frac{2K}{3K+2K} \times \pm 15V = \pm 6V$$

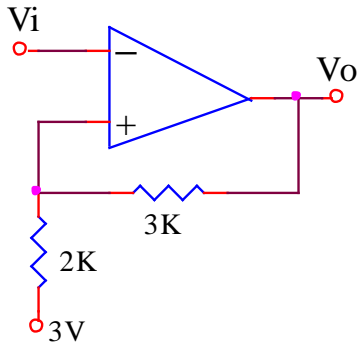
(1) 當 $V_i > +6V$ 時， V_o 轉成 $-15V$ 得 $V_{H^+} = +6V$

(2) 當 $V_i < -6V$ 時， V_o 轉成 $+15V$ 得 $V_{H^-} = -6V$

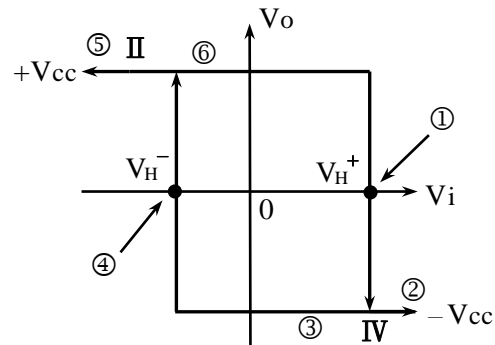
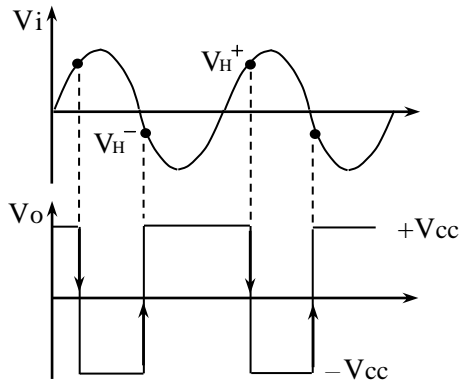


- ① $V_i = V_{H^+}$ ----- $V_o = 0$
- ② $V_i > V_{H^+}$ ----- $V_o = -15V$
- ③ $V_{H^+} > V_i > V_{H^-}$ ---- V_o 保持 $-15V$
- ④ $V_i = V_{H^-}$ ----- $V_o = 0$
- ⑤ $V_i < V_{H^-}$ ----- $V_o = +15V$
- ⑥ $V_{H^+} > V_i > V_{H^-}$ -- V_o 保持 $+15V$

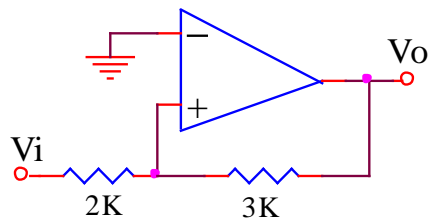
四、反相樞密特(具參考電壓)



$$V_+ = \frac{3K}{2K+3K} \times 3V + \frac{2K}{3K+2K} \times \pm 15V \text{ ----- } + 7.8V(V_{H^+}) \quad - 4.2V(V_{H^-})$$



五、同相樞密特

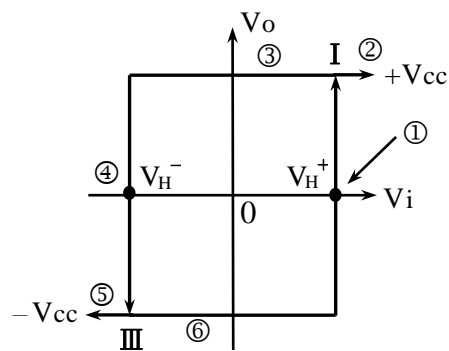
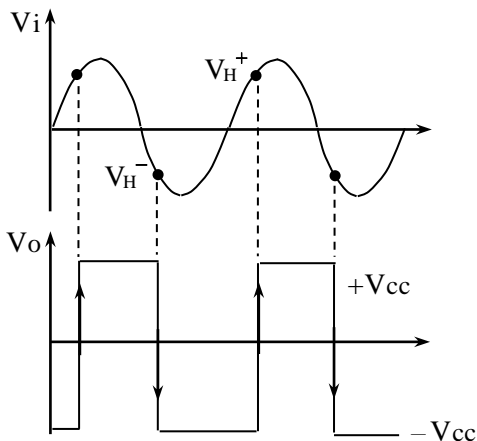


$$V_+ = \frac{3K}{2K+3K} \times V_i + \frac{2K}{3K+2K} \times \pm 15V = 0.6V_i \pm 6V$$

當 $V_+ = 0$ 時, $V_o = 0$, 即 $0 = 0.6V_i \pm 6V$, $V_i = \mp 10V$

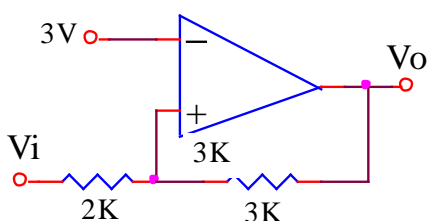
(1) 若 $V_i > +10V$, 則 $V_+ > 0$, V_o 轉態成 $+V_{cc}$, 得 $V_{H^+} = 10V$

(2) 若 $V_i < -10V$, 則 $V_+ < 0$, V_o 轉態成 $-V_{cc}$, 得 $V_{H^-} = -10V$



- ① $V_i = V_{H^+}$ ----- $V_o = 0$
- ② $V_i > V_{H^+}$ ----- $V_o = +15V$
- ③ $V_{H^+} > V_i > V_{H^-}$ ----- V_o 保持 $+15V$
- ④ $V_i = V_{H^-}$ ----- $V_o = 0$
- ⑤ $V_i < V_{H^-}$ ----- $V_o = -15V$
- ⑥ $V_{H^+} > V_i > V_{H^-}$ ----- V_o 保持 $-15V$

六、同相樞密特(具參考電壓)



$$V_+ = \frac{3K}{2K+3K} \times V_i + \frac{2K}{3K+2K} \times \pm 15V = 0.6V_i \pm 6V$$

當 $V_+ = 3V$ 時, $V_o = 0$, 即 $3V = 0.6V_i \pm 6V$, $V_i = +15V, -5V$

(1) 若 $V_i > +15V$, 則 $V_+ > 0$, V_o 轉態成 $+V_{cc}$, 得 $V_{H^+} = 15V$

(2) 若 $V_i < -5V$, 則 $V_+ < 0$, V_o 轉態成 $-V_{cc}$, 得 $V_{H^-} = -5V$