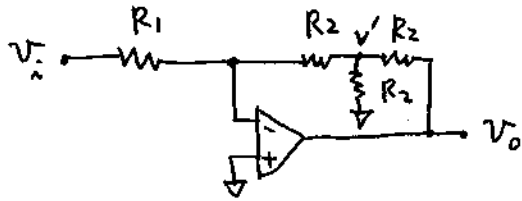


2002년 1학기 계측회로Ⅱ 중간고사

①



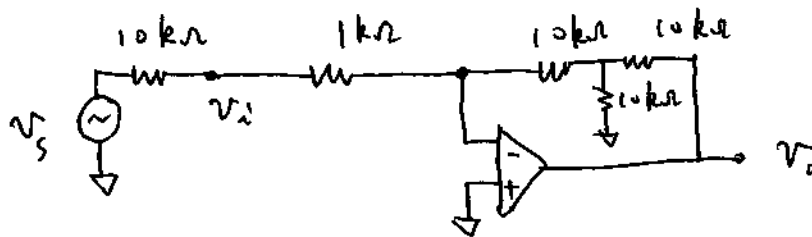
$$\textcircled{a} \quad \frac{v_i}{R_1} = -\frac{v'}{R_2} \Rightarrow v' = -\frac{R_2}{R_1} v_i$$

$$-\frac{v'}{R_2} = \frac{v'}{R_2} + \frac{v' - v_o}{R_2} \Rightarrow v_o = 3v'$$

$$v_o = -3 \frac{R_2}{R_1} v_i$$

$$\therefore A_v = \frac{v_o}{v_i} = -3 \frac{R_2}{R_1}, \quad R_{in} = R_1, \quad R_o \approx 0$$

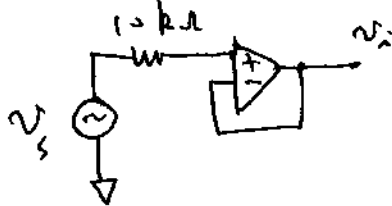
②



이 때 이 입력 저항에 의해 $\frac{1}{10}$ 이하의 이득을 나타낸다.

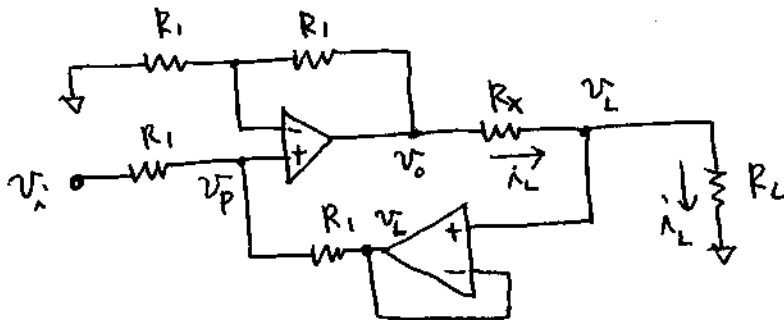
$$v_i = \frac{1}{10+1} v_s \text{ 가 된다.}$$

따라서,



이 때 같은 Buffer를 사용한다.

③



(a) $i_L = \frac{v_o - v_L}{R_x}$, $v_p = \frac{1}{2}(v_i + v_L)$, $v_o = 2v_p$

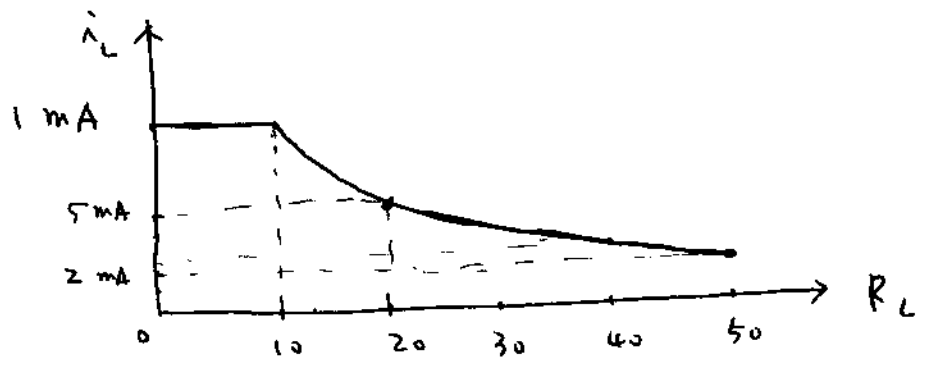
$\therefore i_L = \frac{v_i}{R_x}$

(b) $v_i = 1V$, $R_x = 1k\Omega$ 이면 $i_L = 1mA$

$v_o = R_x i_L + v_L = 1 + v_L$ 이므로

$v_L \in 0 - 10V$

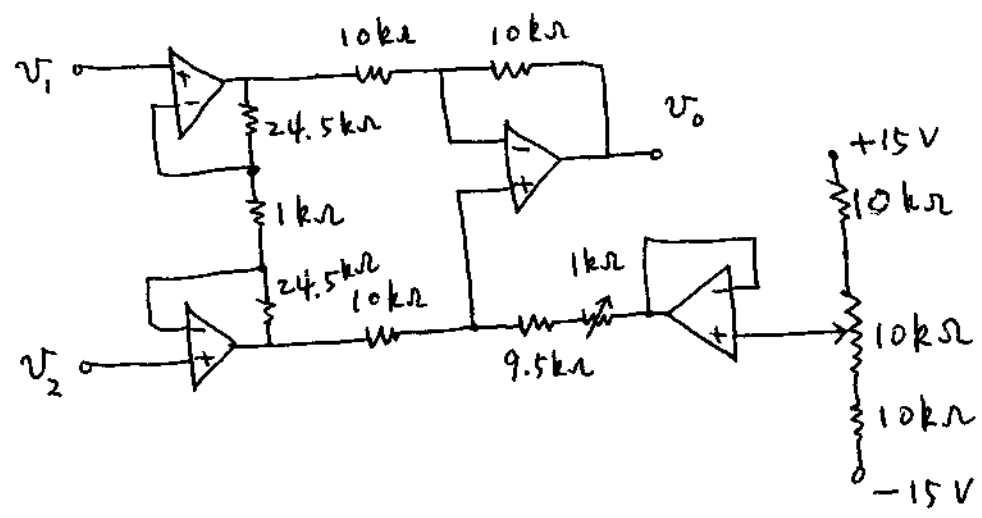
(c) $i_L = 1mA$ 일때 $R_L = 10k\Omega$ 이면 $v_L = 10V$



$R_L = 50k\Omega$ 일때 $v_L = 10V$ 이므로 $i_L = 2mA$

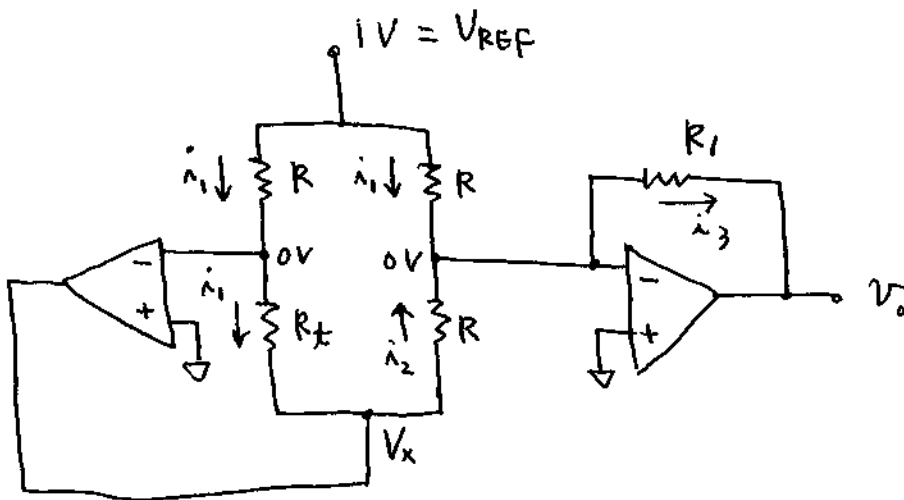
$R_L = 20k\Omega$ 일때 $v_L = 10V$ 이므로 $i_L = 5mA$

(3)



④ ИДМ П73 - П76

⑤



$$\textcircled{a} \quad i_1 = \frac{V_{REF}}{R} = -\frac{V_x}{R_t} \Rightarrow V_x = -\frac{R_t}{R} V_{REF}$$

$$i_2 = \frac{V_x}{R} = -\frac{R_t}{R^2} V_{REF}$$

$$i_3 = i_1 + i_2 = \frac{V_{REF}}{R} - \frac{R_t}{R^2} V_{REF}$$

$$= \frac{R - R_t}{R^2} V_{REF} = \frac{-R_t}{R^2} V_{REF}$$

$$= -\frac{R_t}{R} V_{REF}$$

$$V_0 = -R_1 i_3 = \frac{R_1}{R} V_{REF} = \frac{R_1}{R} \Delta T$$

⑥

$$R = 100 \Omega \text{ или } 10^2$$

$$V_0 = \frac{R_1}{100} \times 0.004 \times T$$

$$\frac{dV_0}{dT} = \frac{0.004 \times R_1}{100} = 0.1 \text{ мВ/К} \quad R_1 = 2.5 \text{ к}\Omega$$