V_o

V_1

R

n

V_i

$i = 1, \cdots, n$

$$\frac{V_1 - V_0}{R} + \frac{V_2 - V_0}{R} + \frac{V_3 - V_0}{R} = \frac{V_0}{R}, \qquad V_0 = \frac{V_1 + V_2 + V_3}{4}$$

$$V_0 = \frac{1}{n+1} \sum_{i=1}^{n} V_i$$

$V_1 = 20V$

$$V_2 = V_3 = 10V$$

$$R_1 = R_5 = 10\Omega$$

$$R_2 = R_4 = 5\Omega$$

$R_6 = 1.5\Omega$

$R_3 = 6\Omega$

V_{ab}

R_3

V_T

$$V_{ab} = V_a - V_b = V_1 \frac{R_5}{R_1 + R_5} - V_2 \frac{R_4}{R_2 + R_4} = 20 \frac{10}{10 + 10} - 10 \frac{5}{5 + 5} = 10 - 5 = 5$$

R_T

$$R_T = R_1//R_5 + R_6 + R_2//R_4 = \frac{R_1 R_5}{R_1 + R_5} + R_6 + \frac{R_4 R_2}{R_2 + R_4} = 9$$

$$I = \frac{V_T - V_3}{R_T + R_3} = \frac{5 - 10}{9 + 6} = -\frac{1}{3}$$

$$V_{ab} = -\frac{1}{3} \times 6 + 10 = 8V$$

$$I_0 = 6A$$

$$V_0 = 5V$$

$$R_2 = R_4 = 4\Omega$$

$$R_1 = 2\Omega$$

$R_3 = 8\Omega$

$R_5 = 6\Omega$

I_0

$V_0 = 0$

R_1

$$R_a = \frac{2 \times 4}{2+6+4} = \frac{2}{3}, \quad R_b = \frac{2 \times 6}{2+6+4} = 1, \quad R_c = \frac{4 \times 6}{2+6+4} = 2$$

R_a

R_b

R_c

R_4

$I' = 0$

V_0

$I_0 = 0$

15Ω

$$I_{total} = 5V/15\Omega = 1/3\ A$$

$I'' = 1/6\ A$

$$I = I' + I'' = 1/6\ A$$