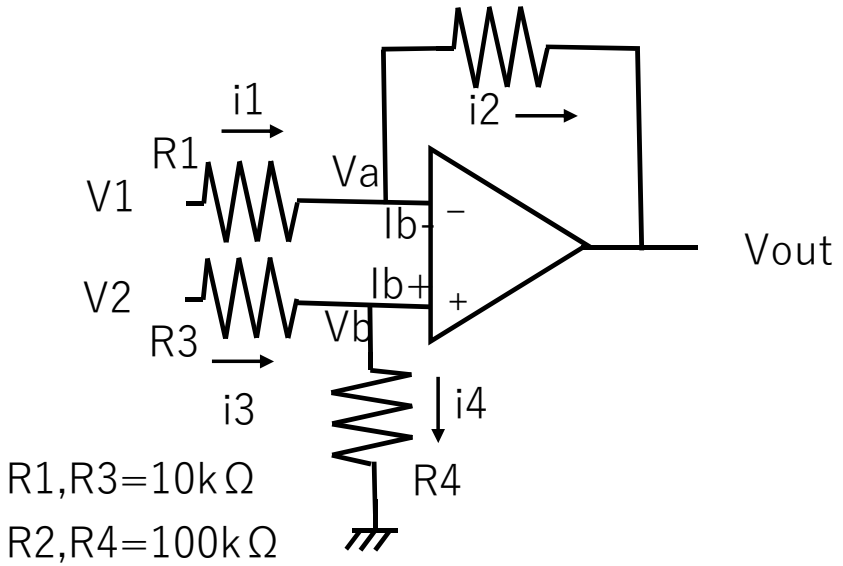

$i1 = ib- + i2 \cdots ①$

$i2 = ib+ + i4 \cdots ②$

$$i1 = \frac{V1 - Va}{R1} \qquad i2 = \frac{Va - Vout}{R2}$$

$$i3 = \frac{V2 - Vb}{R3} \qquad i4 = \frac{Vb}{R4}$$

From ① $$\frac{V1 - Va}{R1} = ib- + \frac{Va - Vout}{R2}$$

$$\frac{V1}{R1} + \frac{Vout}{R2} - ib- = \frac{Va}{R2} + \frac{Va}{R1}$$

$$Va = \left(\frac{V1}{R1} + \frac{Vout}{R2} - ib- \right) \left(\frac{1}{\frac{1}{R1} + \frac{1}{R2}} \right) \quad \cdots ③$$

From ② $\frac{V2 - Vb}{R3} = ib+ + \frac{Vb}{R4}$ ⇒ $\frac{V2}{R3} + Ib+ = Vb\left(\frac{1}{R3} + \frac{1}{R4}\right)$

$$Vb = \left(\frac{V2}{R3} - ib+\right)\left(\frac{1}{\frac{1}{R3} + \frac{1}{R4}}\right) \quad \cdots ④$$

OPA formula $Vout = A\,(Vb - Va + Voffset)$ Insert ③④

$$Vout = A\left(\left(\frac{V2}{R3} - ib+\right)\left(\frac{R3\,R4}{R3 + R4}\right) - \left(\frac{V1}{R1} + \frac{Vout}{R2} - ib-\right)\left(\frac{R1\,R2}{R1 + R2}\right) + Voffset\right)$$

$$Vout + A\frac{Vout\,R1}{R1 + R2} = A\left(\left(\frac{V2}{R3} - ib+\right)\left(\frac{R3\,R4}{R3 + R4}\right) - \left(\frac{V1}{R1} - ib-\right)\left(\frac{R1\,R2}{R1 + R2}\right) + Voffset\right)$$

$$Vout\left(1 + \frac{R1}{R1 + R2}A\right) =$$

$$\mathrm{Vout} = \frac{\frac{R4}{R3+R4}V2 - \frac{R2}{R1+R2}V1 + \frac{R1\,R2}{R1+R2}ib- - \frac{R3R4}{R3+R4} + \mathrm{Voffset}}{\frac{1}{A} + \frac{R1}{R1+R2}}$$

$A \to \infty$

$$\mathrm{Vout} = \frac{R4}{R1}\frac{R1+R2}{R3+R4}V2 - \frac{R2}{R1}V1 + R2\,ib- - \frac{R3R4}{R1}\frac{R1+R2}{R3+R4}Ib+ + \frac{R1+R2}{R1}\mathrm{Voffset} \quad \cdots ⑤$$

$$\frac{R2}{R1} = \frac{R4}{R3} = 10$$

$$\mathrm{Vout} = \frac{\frac{10}{1+10}V2 - \frac{10}{1+10}V1 + \frac{R2}{1+10}ib- - \frac{R4}{1+10}Ib+ + \mathrm{Voffset}}{\frac{1}{A} + \frac{1}{1+10}}$$

$$Vout = 10(V2 - V1) + R2ib- - R4ib+ + 11Voffset$$

In Datasheet Relation Ios & Ib @ Note 9

$$Iosx22.5k+Ibx22.5k\left(1-\frac{Rp}{Rn}\right) \Rightarrow 22.5k(Ios+Ib) - Ib22.5k\ \frac{Rp}{Rn}$$

⑤ ib+, ib-

$$Vout = \frac{R4}{R1}\frac{R1+R2}{R3+R4}V2 - \frac{R2}{R1}V1 + R2ib- - \frac{R3R4}{R1}\frac{R1+R2}{R3+R4}Ib+ + \frac{R1+R2}{R1}Voffset \quad \cdots ⑤$$

Rp = R3+R4 ??
Rn = R1+R2 ??