$$\frac{V_2 R_2}{R_4+R_2} = \frac{R_3}{2R_2+R_3} V_S + \frac{R_2}{2R_2+R_3}(V_3+V_1)$$

$$V_S = \frac{2R_2+R_3}{R_3}\left[\frac{R_2}{R_4+R_2}V_2 - \frac{R_2}{2R_2+R_3}(V_3+V_1)\right]$$

$$= \frac{R_2}{R_3}\left[\frac{2R_2+R_3}{R_4+R_2}V_2 - (V_3+V_1)\right]$$

$$= \frac{R_2}{R_3}\left[aV_2 - V_3 - V_1\right].$$

$v_{2_{GND}} = v_{N_{GND}} + v_{2N}.$

$$(a v_{2N} - v_{3N} - v_{1N}) \underbrace{+ a v_{NGND} - v_{NGND} - v_{NGND}}_{=0 \text{ si } a = 2.}$$

C1 $\quad a = \frac{2R_2+R_3}{R_4+R_2} = 2$

$$\overbrace{v_{2N} - v_{3N}}^{u_{23}} \; \overbrace{+ v_{2N} - v_{1N}}^{u_{21}}$$

alors $\quad v_{S_{GND}} = \frac{R_2}{R_3}\left[2v_{2N} - v_{3N} - v_{1N}\right]$

Δ eff.

$$\boxed{\begin{aligned} v_{\cos} &= \frac{R_2}{R_3} KE \times \text{[redacted]} \times 3 \\ \text{rappel} \quad v_{\sin} &= \frac{R_1}{R_4} KE\sqrt{3} \end{aligned}}$$

$\cos\theta = V_{S\,eff}$ $\cos\theta$.

$\sin\theta = V_{S\,eff} \times$ $\sin\theta$

en [illegible]

$v_{S\,eff}$ pris $= 2 v_{eff}$

$$\Rightarrow \frac{R_1}{R_4} = \frac{R_2}{R_3} \times \sqrt{3}$$

et $\quad V_{S\,eff} = \frac{R_1}{R_4} KE \times \sqrt{3}.$

choix $R_1 \dots R_4$.

$$\begin{cases} a = \dfrac{2R_2+R_3}{R_4+R_2} = 2. \\ V_{s\,eff} = \dfrac{R_1}{R_4} KE\sqrt{3} \\ \dfrac{R_1}{R_4} = \dfrac{R_2}{R_3} \times \sqrt{3} \end{cases} \qquad \begin{cases} \dfrac{2R_2+R_3}{R_4+R_2} = 2. & (1) \\ R_1/R_4 = k. & (2) \\ \dfrac{R_1}{R_4} = \sqrt{3}\dfrac{R_2}{R_3} & (3) \end{cases}$$

$\Rightarrow V_{s\,eff} = 2V_{e\,eff}$ (voulu) $\Rightarrow \dfrac{R_1}{R_4} = \dfrac{2V_{eff}}{KE\sqrt{3}} = k.$

$\Rightarrow \dfrac{R_2}{R_3} = \dfrac{1}{\sqrt{3}}\dfrac{R_1}{R_4} = \dfrac{k}{\sqrt{3}}.$

$\Rightarrow V_{s\,eff} = 2 \Rightarrow \dfrac{R_1}{R_4} = k \Rightarrow \dfrac{R_2}{R_3} = \dfrac{k}{\sqrt{3}}$

$$\frac{\frac{2k}{3}R_3 + R_3}{R_1/k + \frac{k}{3}R_3} = 2 \qquad \frac{(2k+3)R_3\ \cancel{3}k}{\cancel{3}\ (3R_1 + k^2)} = 2.$$

$$(2k+3)R_3 \times k = 6R_1 + 2k^2.$$

A.N : $KE\sqrt{3} = 90. \Rightarrow \dfrac{R_1}{R_4} = \dfrac{2}{90} = 2{,}22\dots 10^{-2}$

$\boxed{R_4 = \dfrac{R_1}{k}}$ (1)

~~$R_3 = \dfrac{(2k+3)k - 2k^2}{6}$~~

(2) $R_3 = \dfrac{6R_1 + 2k^2}{(2k+3)k} \sim \dfrac{6R_1}{3k} \sim \dfrac{2R_1}{k} \Rightarrow \boxed{R_3 \sim 2R_4}$

or $\dfrac{R_1}{k} = R_4$

et $\dfrac{R_1}{R_4} = 3\dfrac{R_2}{R_3}$ (3).

$\dfrac{R_1}{R_4} = 3\dfrac{R_2}{2R_4}$

$\boxed{R_2 = \dfrac{2}{\sqrt{3}}R_1}$

d : on fixe R_1

et $R_4 = R_1/k$, $R_3 = 2R_4$ et $R_2 = \dfrac{2}{\sqrt{3}}R_1 = 1{,}154R_1$

Vrai si k faible!