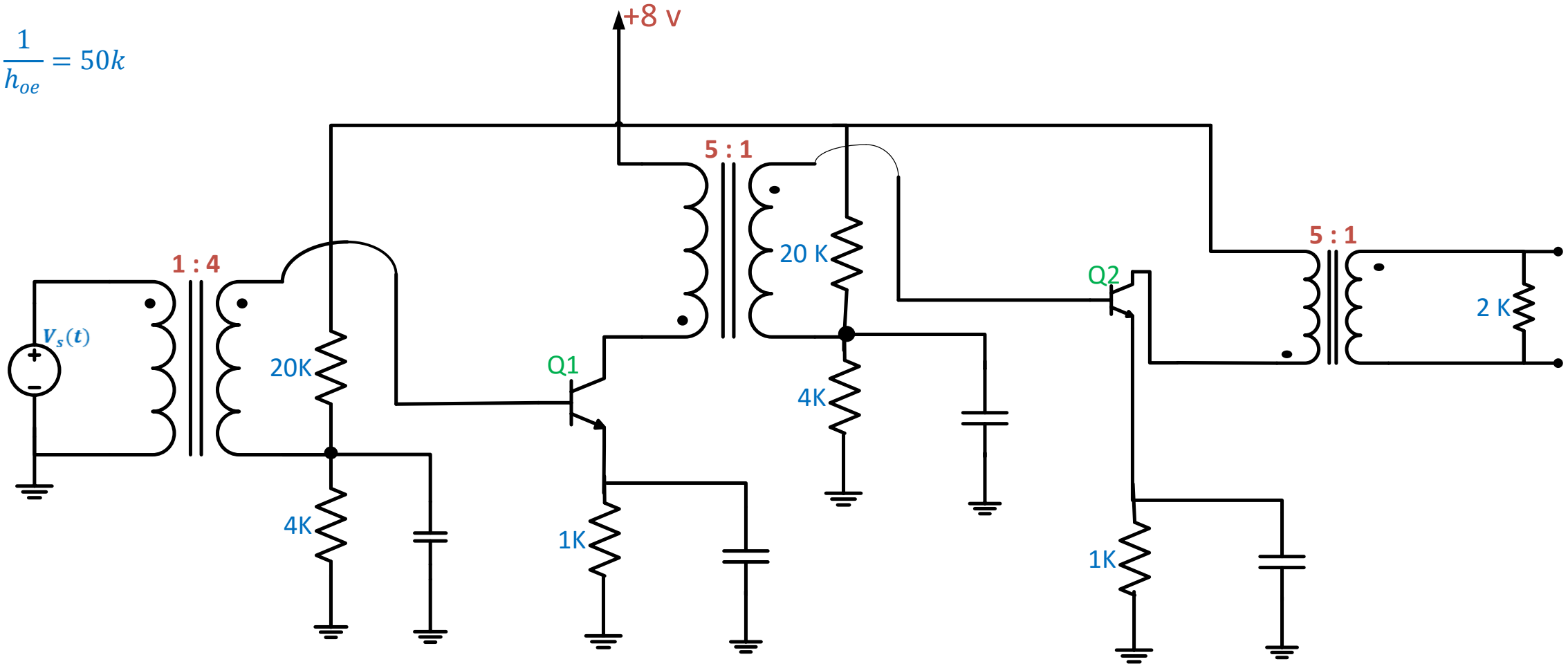
3) Transformer coupled multistage amplifier

hfe = 50

$$\frac{1}{h_{oe}} = 50k$$



3) Transformer coupled multistage amplifier

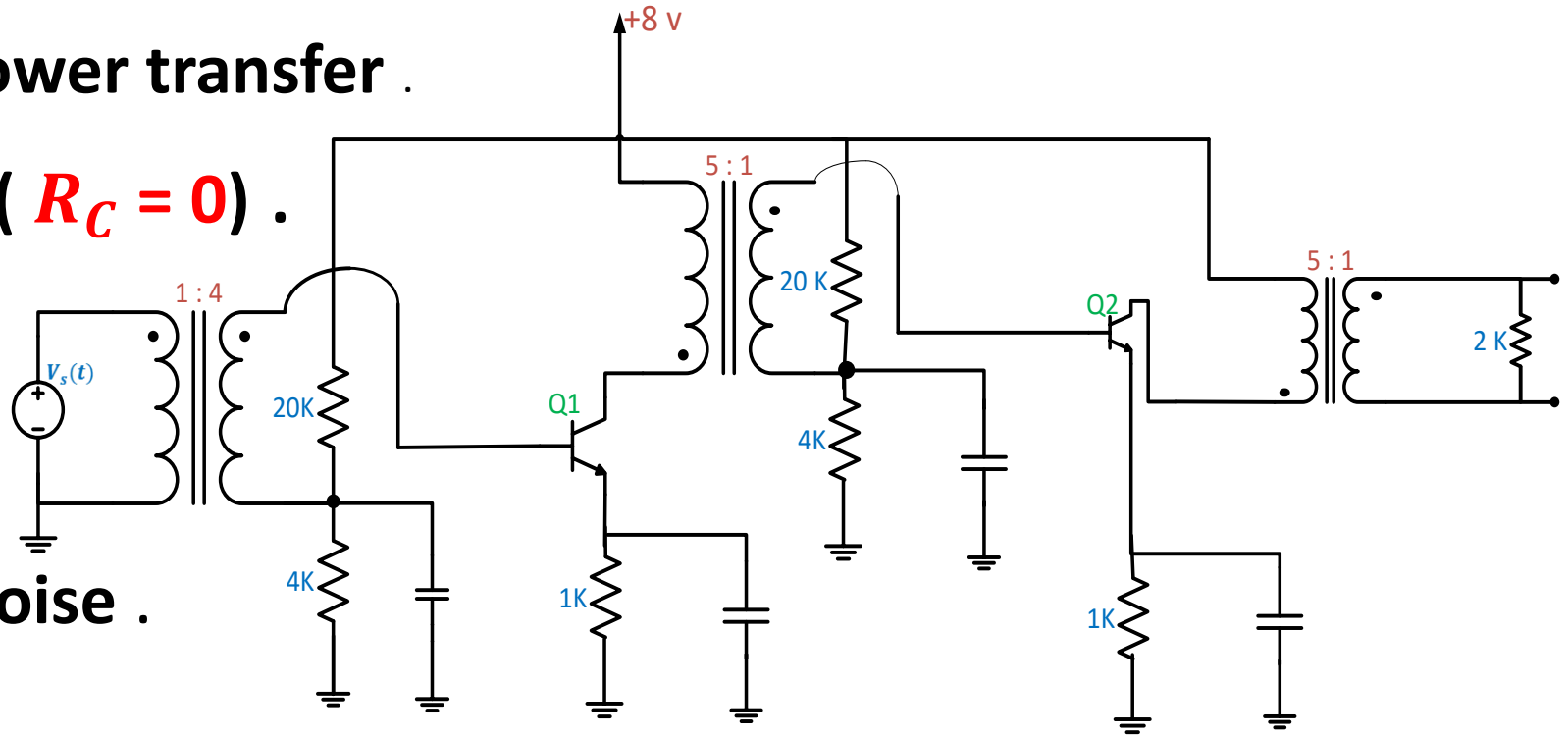
Advantages:

1) The coupling transformer is used to pass the ac signal from one stage to the next , while blocking the DC voltages .

2) DC isolation .

3) matching for maximum power transfer .

4) low dc power dissipation ($R_C = 0$) .



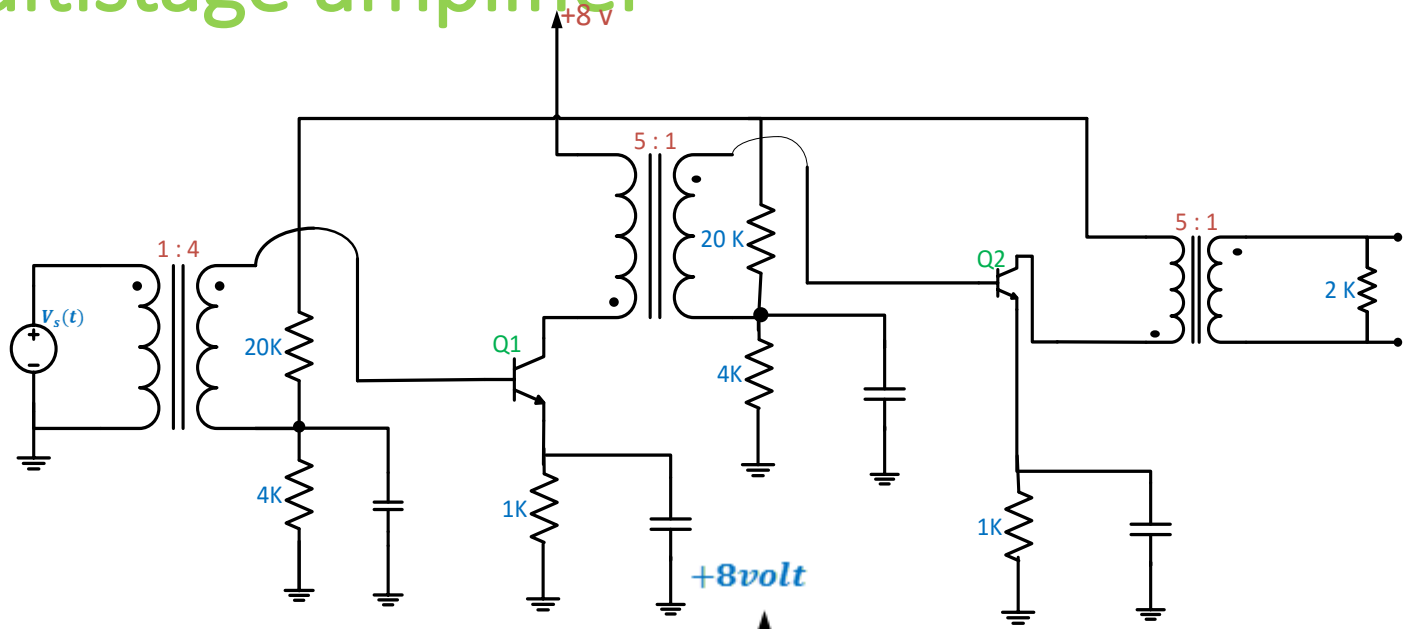
Disadvantages

1) cost , weight , size , and noise .

2) poor frequency response .

3) Transformer coupled multistage amplifier

DC Analysis:

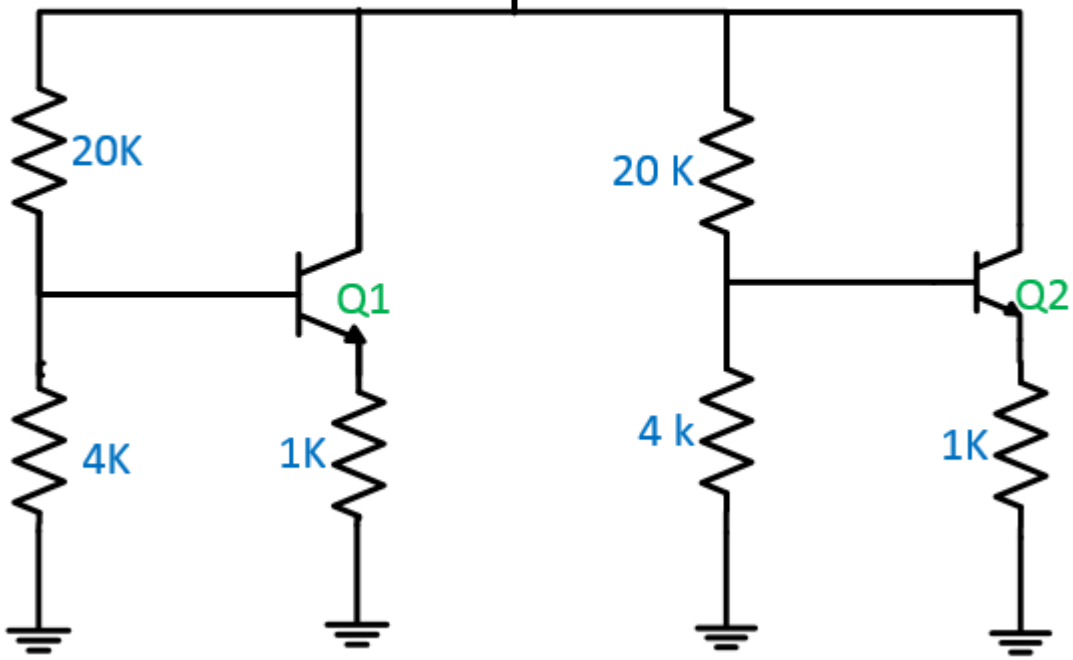


$$R_{TH1} = R_{TH2} = 4K \,\backslash\backslash\, 20K = 3.33K$$

$$V_{TH1} = V_{TH2} = \frac{4K}{4K+20K}(+8) = 1.33\ V$$

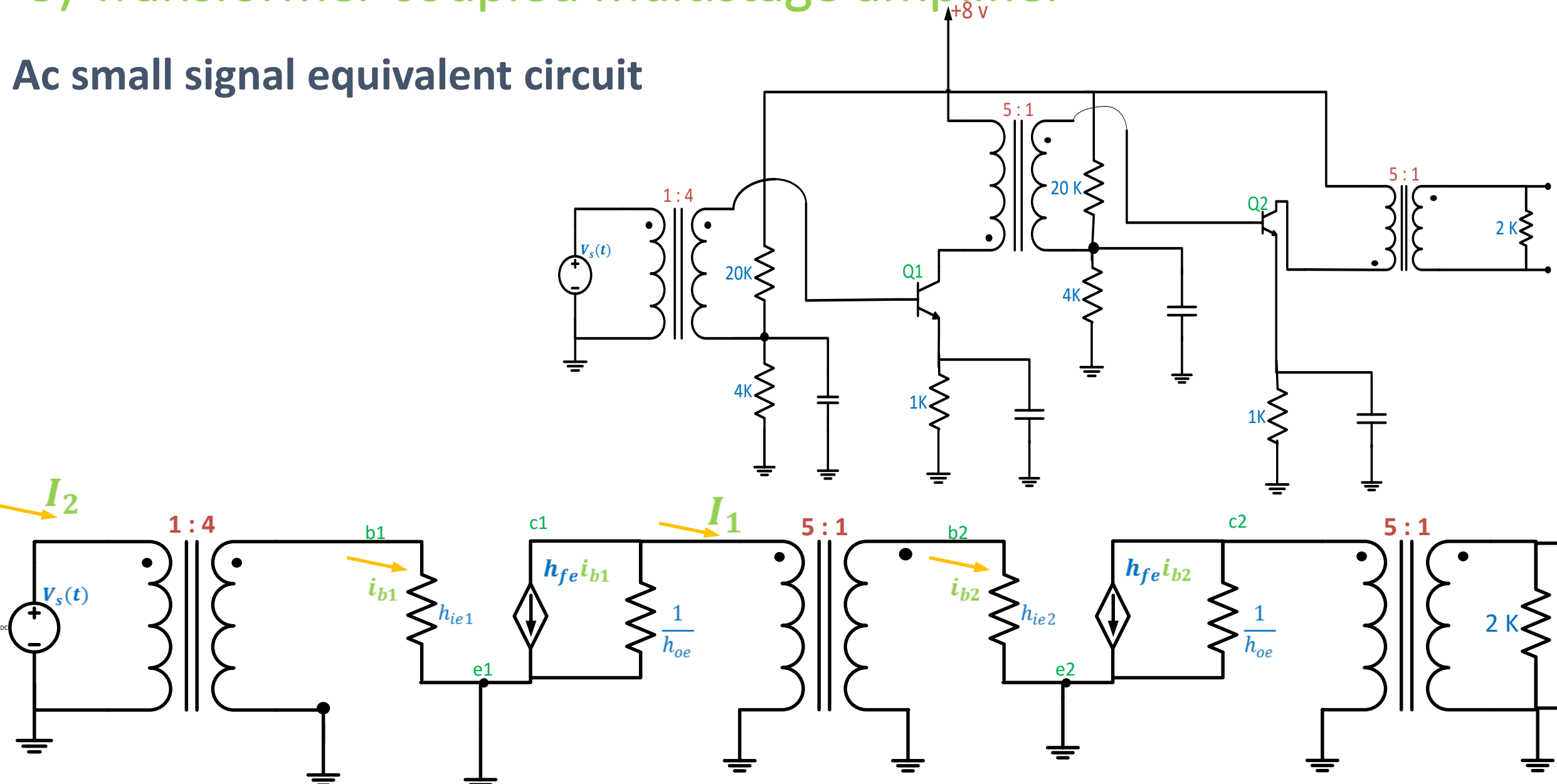
$$I_{E1} = I_{E2} = \frac{4K}{\frac{R_{TH}}{\beta+1}+1K} = 0.595\ mA$$

$$\therefore \quad h_{ie1} = h_{ie2} = 2K$$



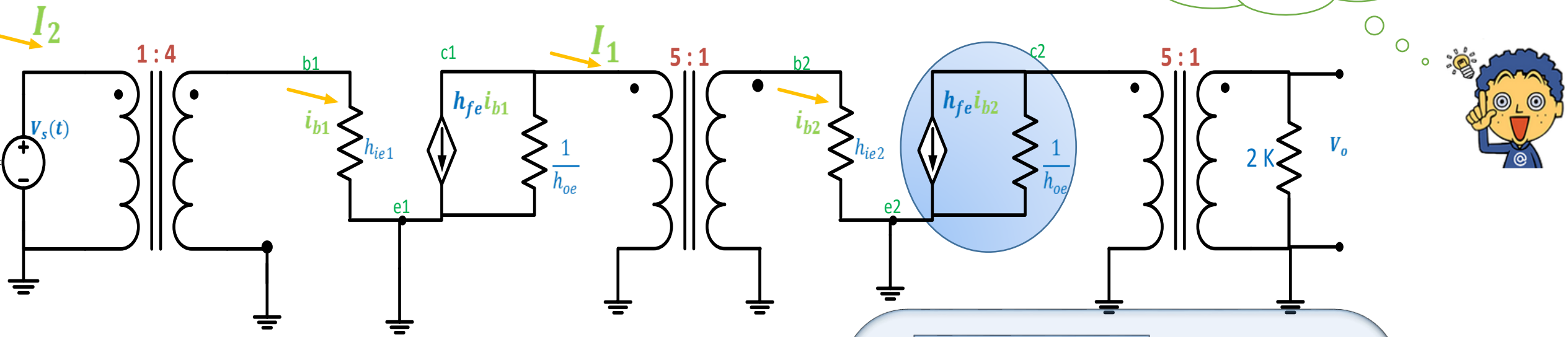
3) Transformer coupled multistage amplifier

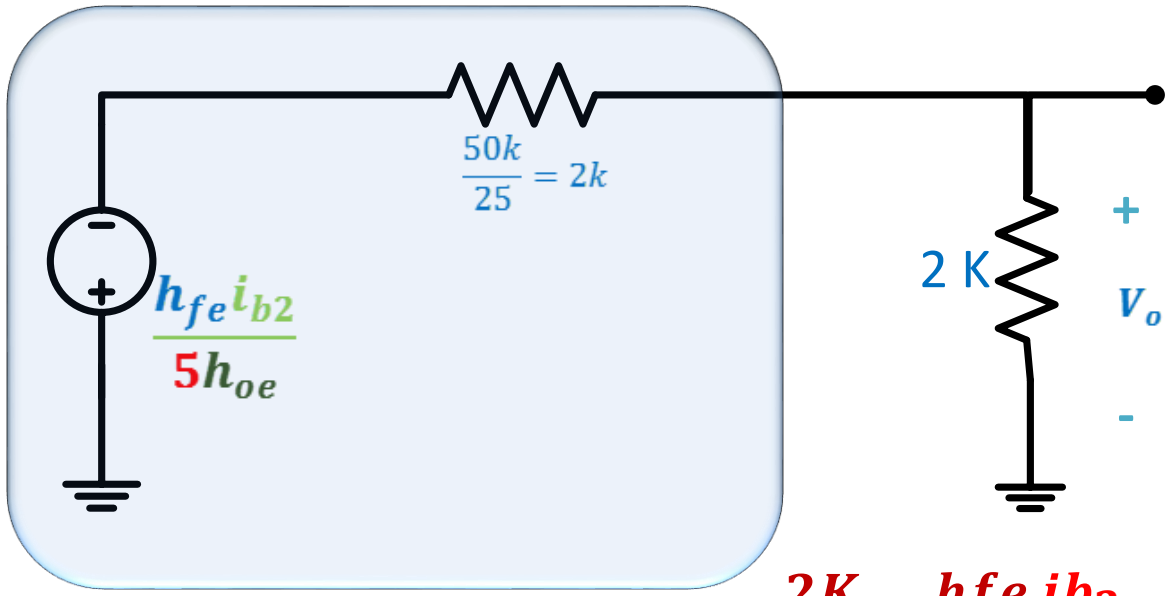
Ac small signal equivalent circuit

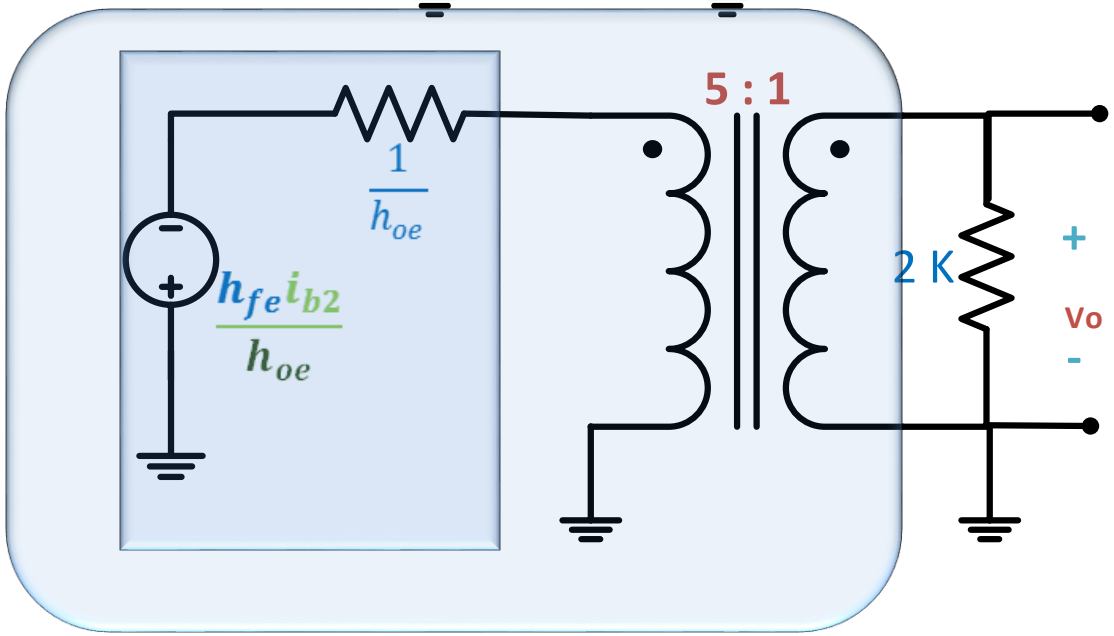


3) Transformer coupled multistage amplifier

Transformation



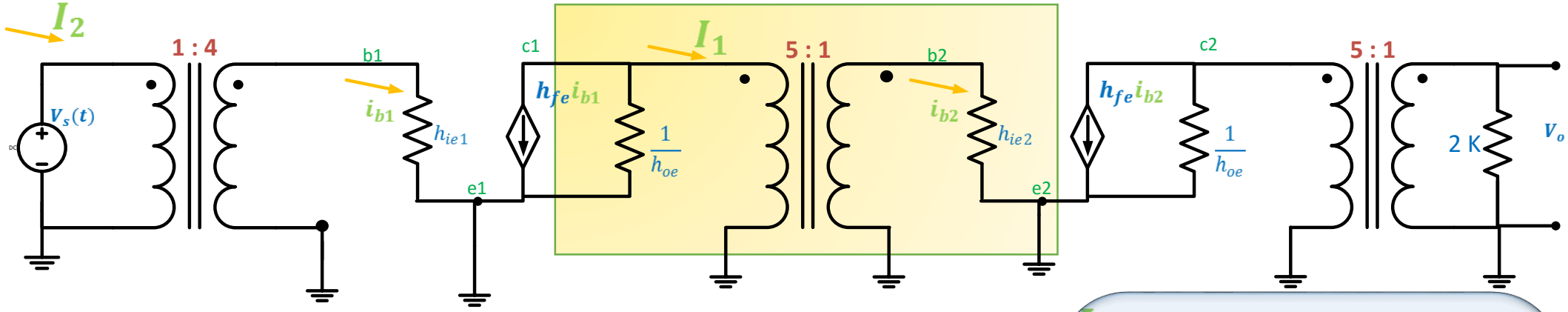




$$V_O = - \frac{2K}{2K+2K} \frac{hfe\ ib_2}{5hoe}$$

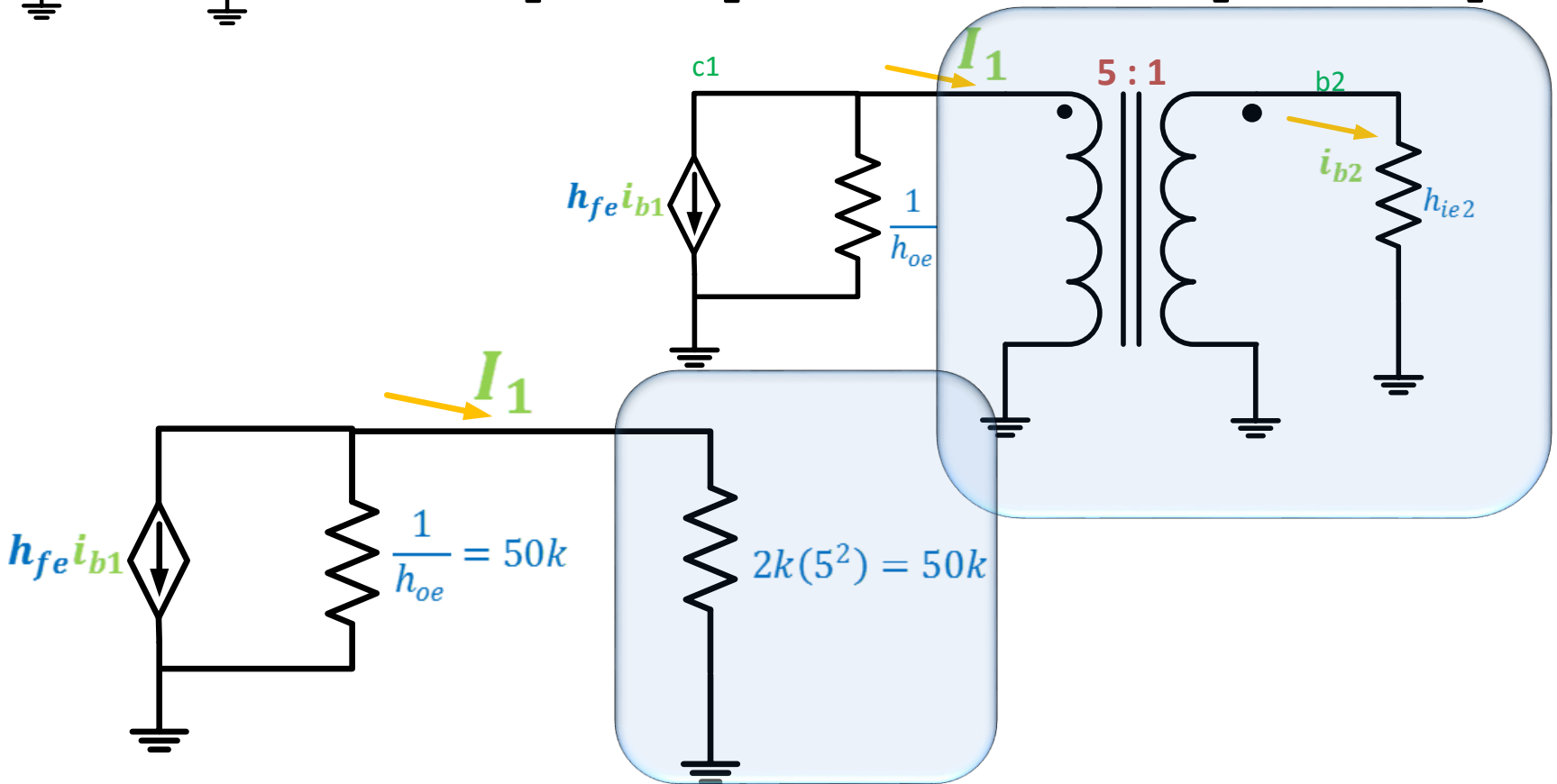
3) Transformer coupled multistage amplifier

To find ib_2



$$ib_2 = 5I_1$$

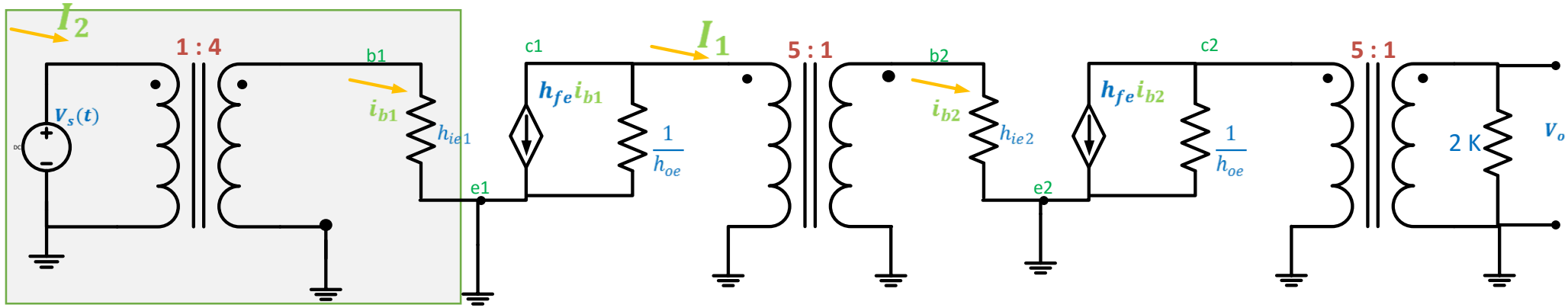
To find I_1



$$I_1 = -hfe\ ib_1 \frac{50K}{50K+50K}$$

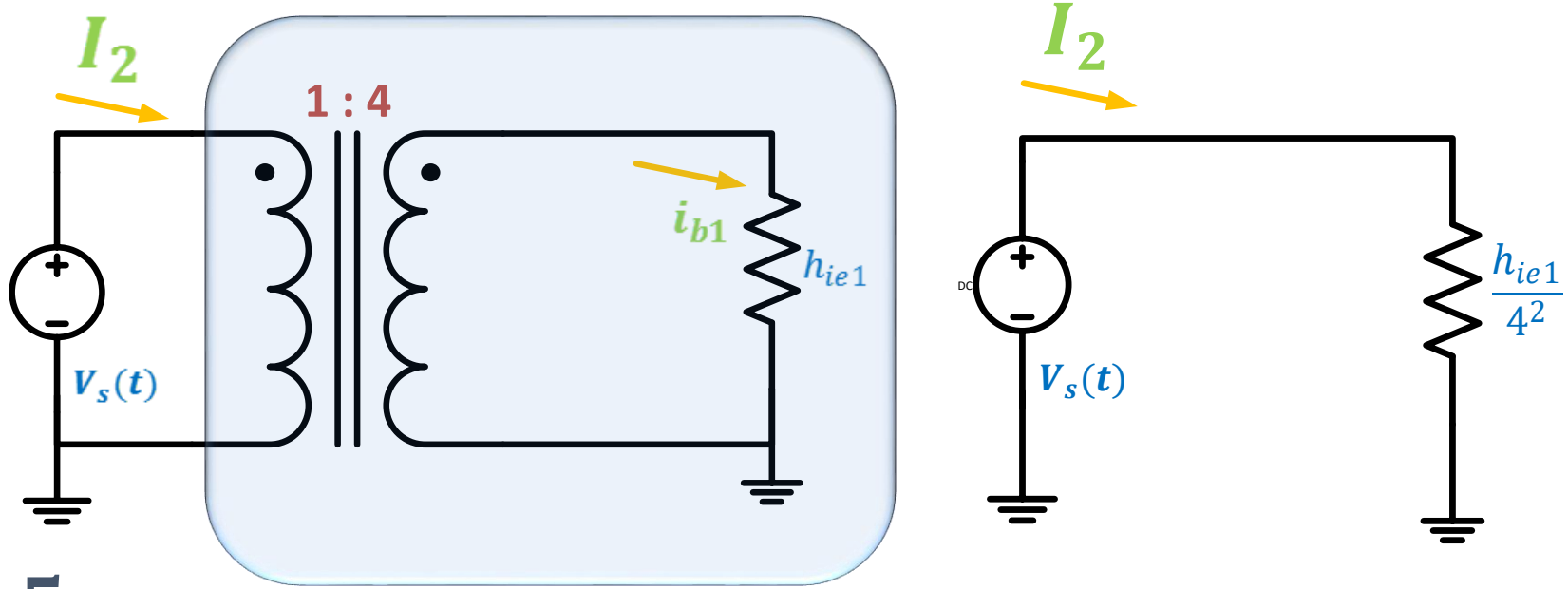
3) Transformer coupled multistage amplifier

To find ib_1



$$ib_1 = +\frac{1}{4}I_2$$

To find I_2



$$I_2 = \frac{V_S}{\frac{h_{ie1}}{16}}$$

$$\therefore A_v = \frac{V_o}{V_S} = +62.5$$