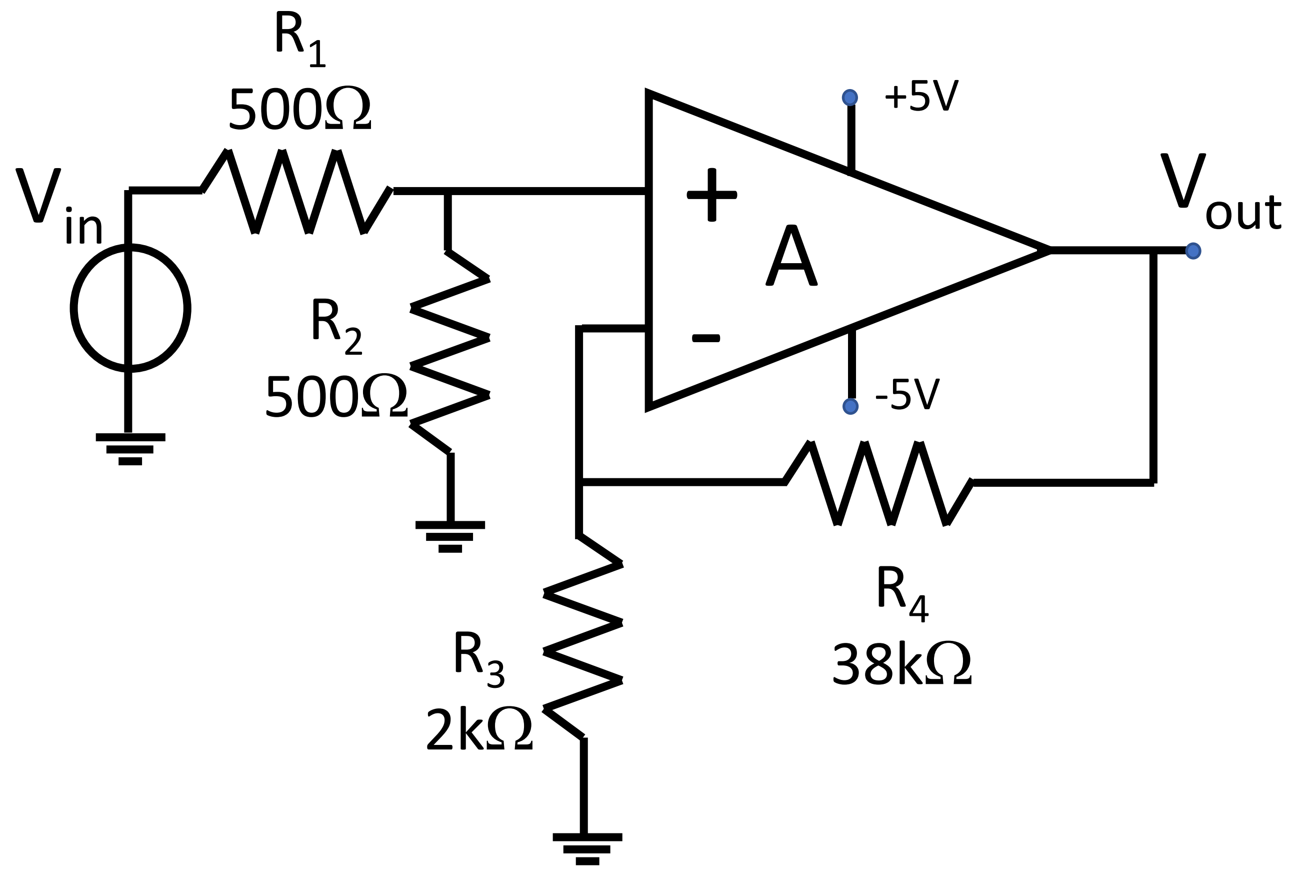
Exercise (1)



a) What is the ideal Gain (A=∞) of the circuit ?

b) What is the maximum amplitude of a sinusoid that can be applied to the input ?

c) What is the actual Gain if A=8000 ?

d) If A is provided by the manufacturer with 40% of possible variations, what would be the distribution of performance of the produced amplifier ?

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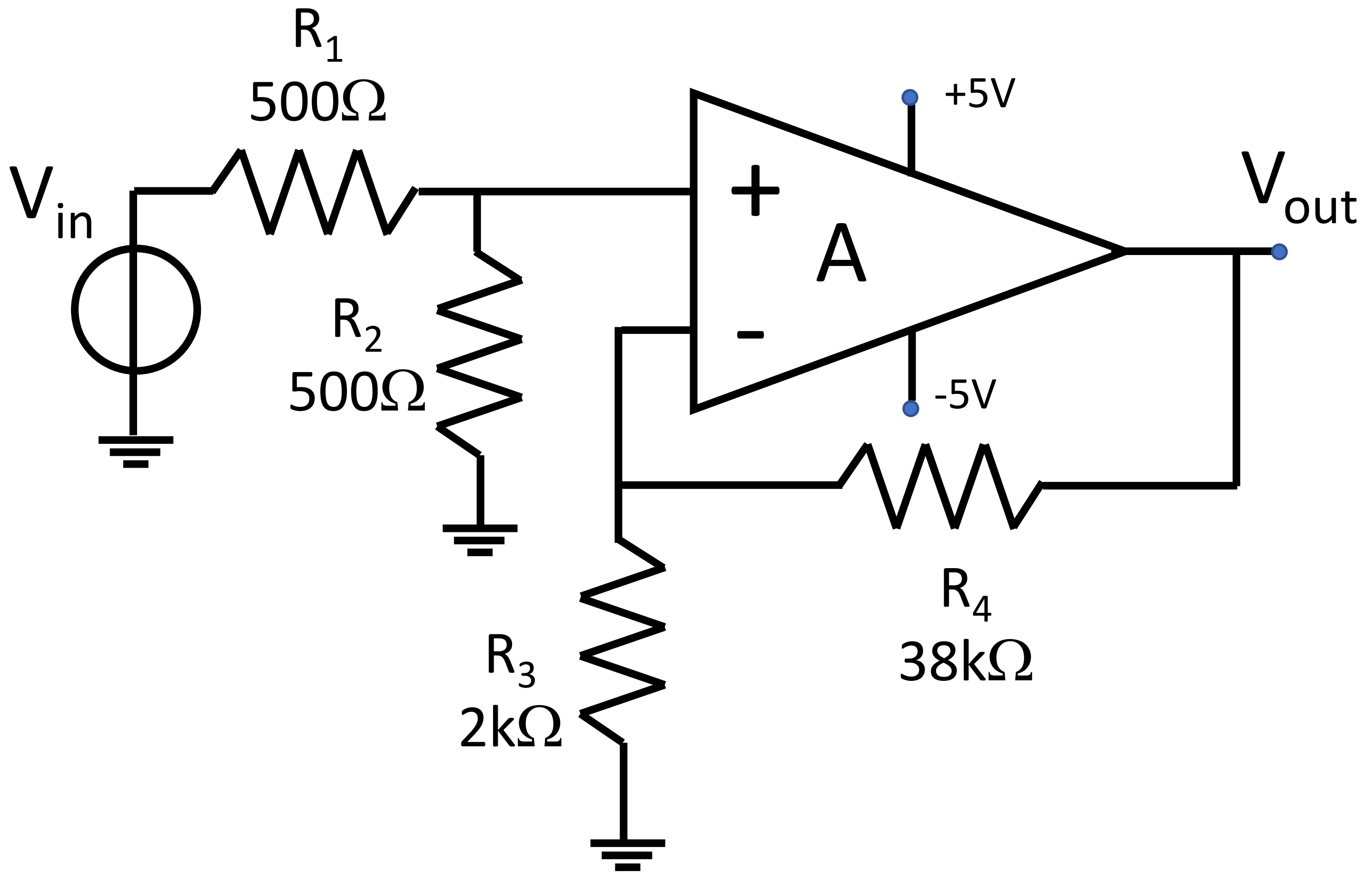
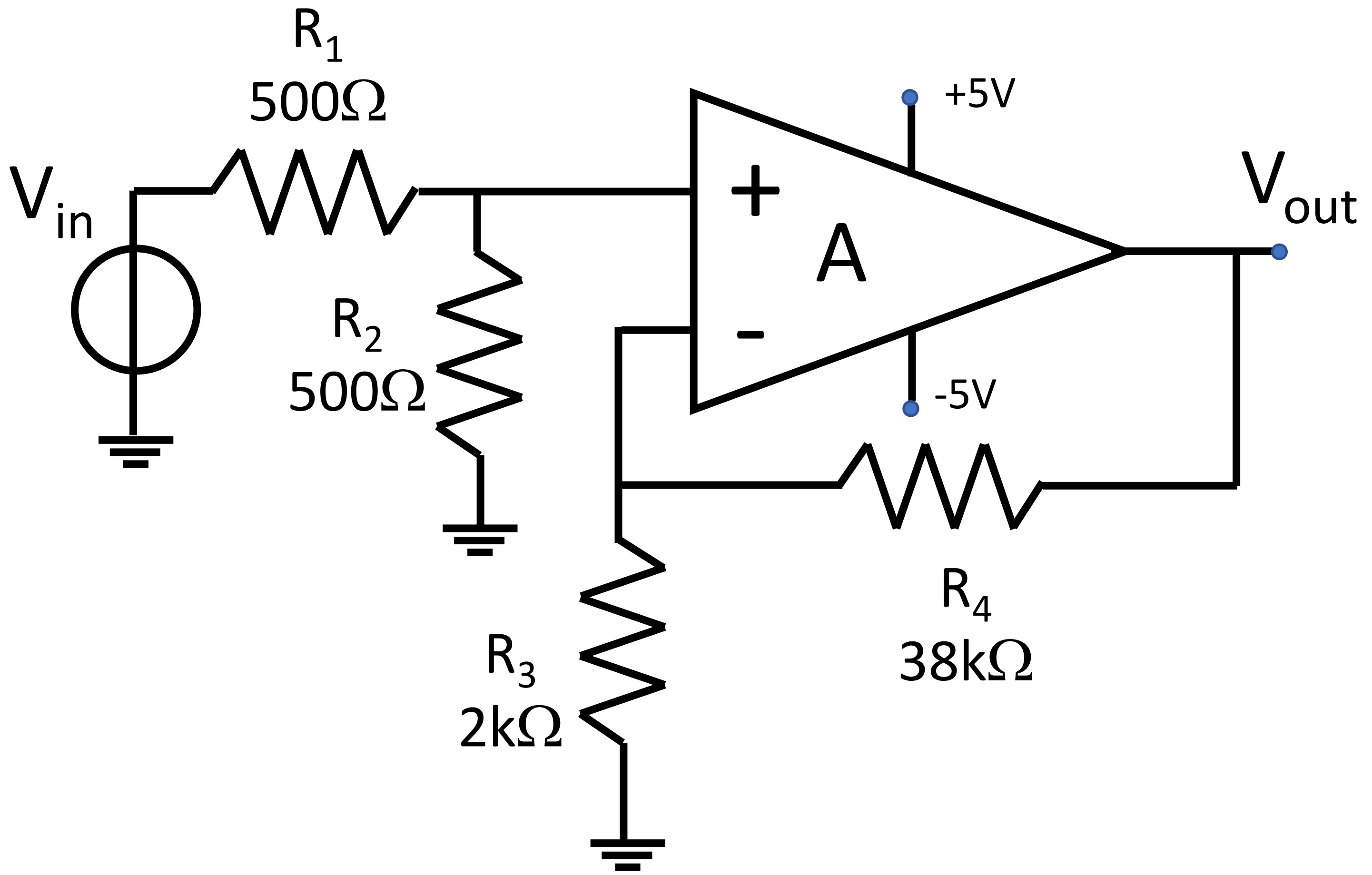
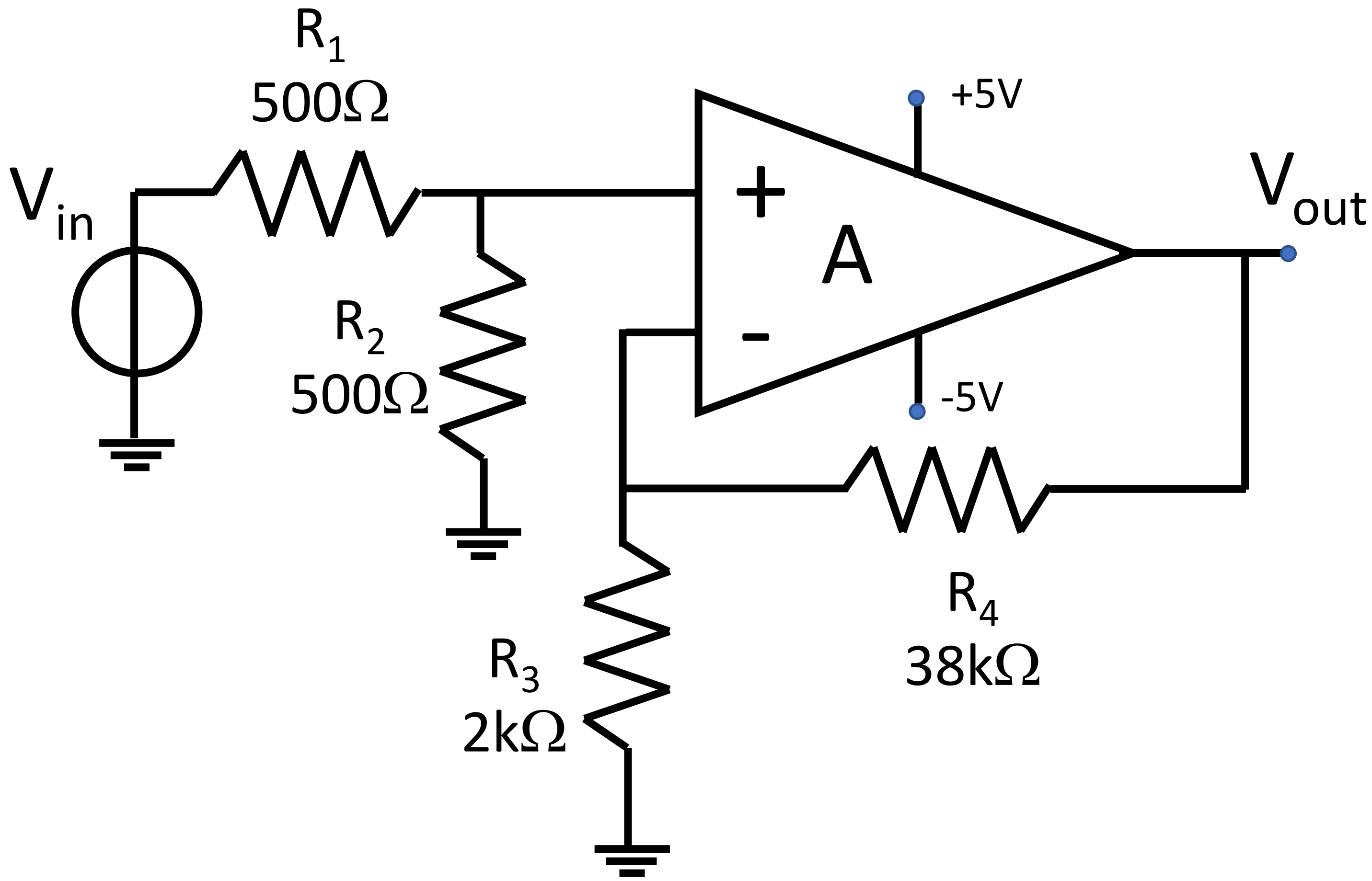


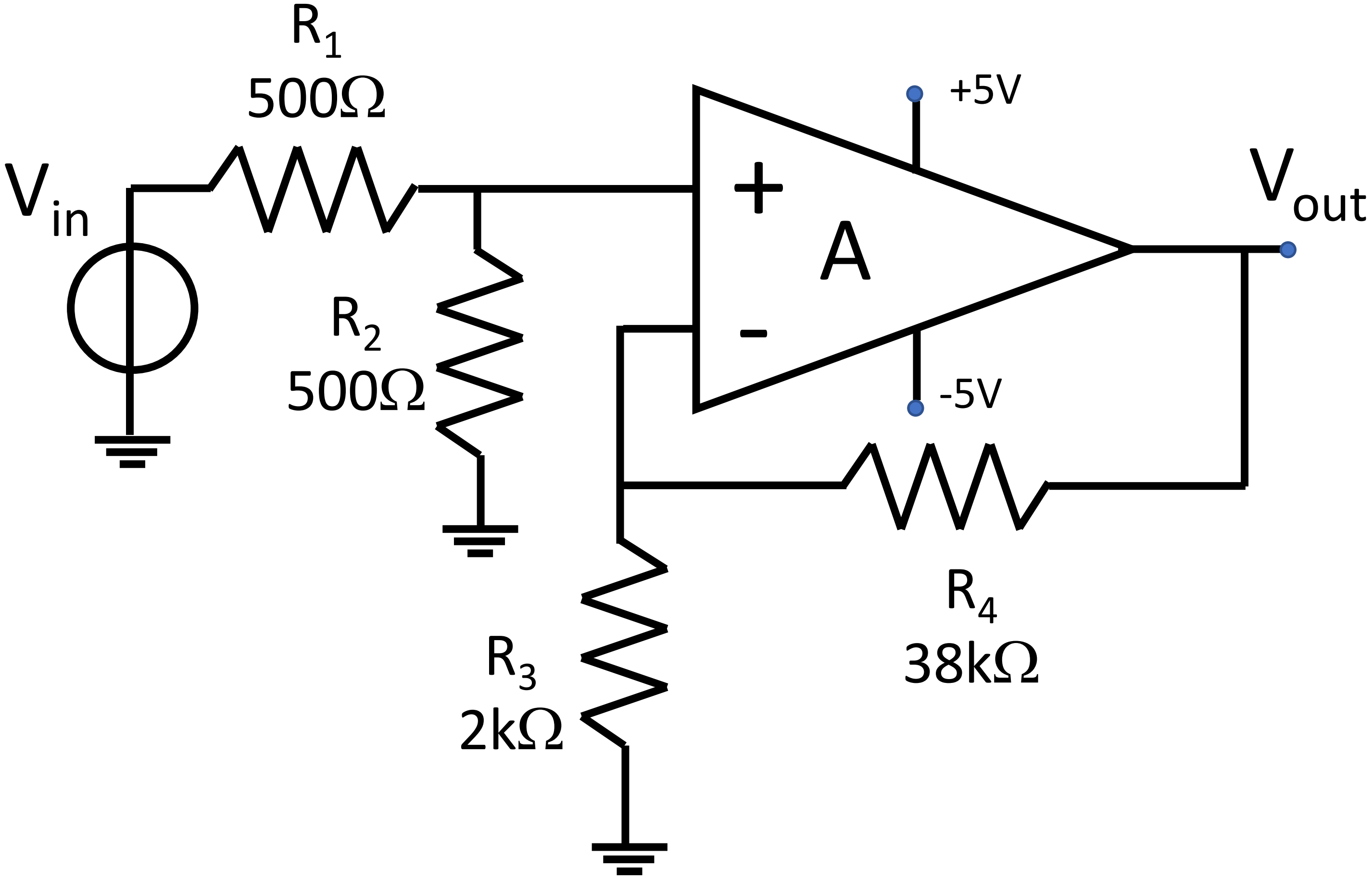
b) What is the maximum amplitude of a sinusoid that can be applied to the input ?



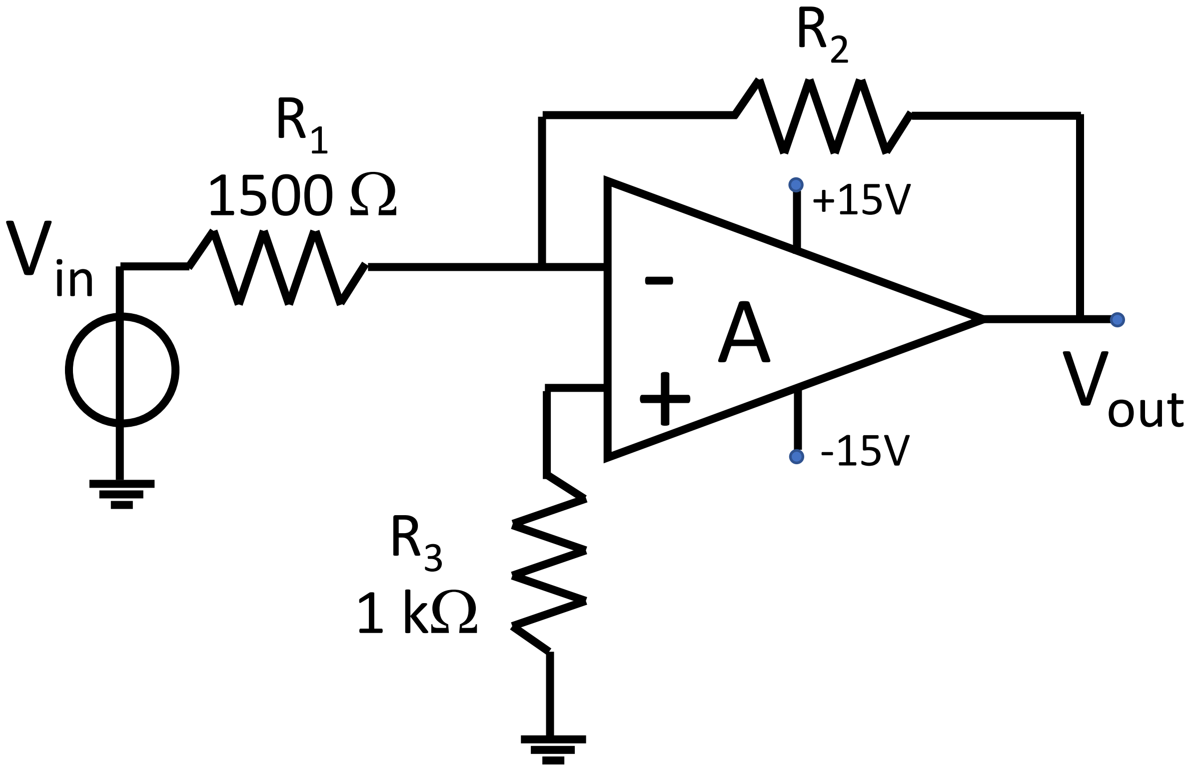
c) What is the actual Gain if A=8000 ?



d) If A is provided by the manufacturer with 40% of possible variations, what would be the distribution of performance of the produced amplifier ?



Exercise (2)



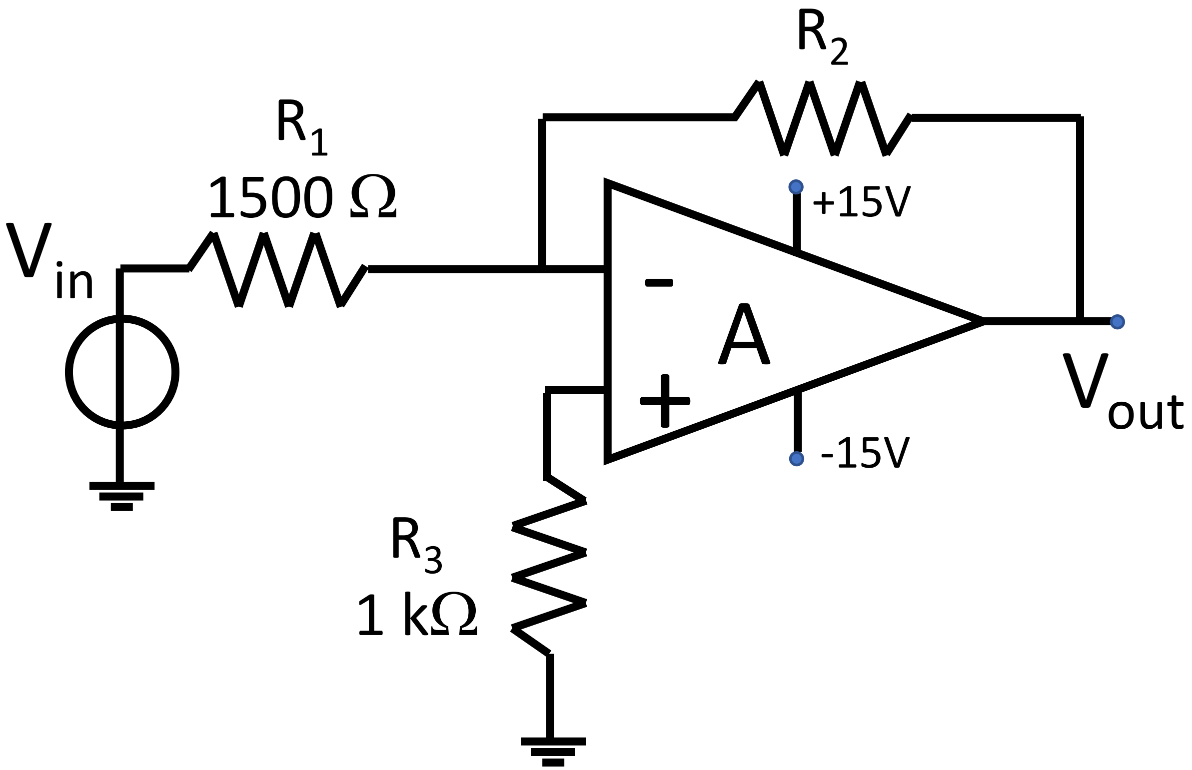
a) Find the value of R2 in order to have an ideal Gain ($A=\infty$) equal to G=-6

b) How does R3 play a role in the gain ?

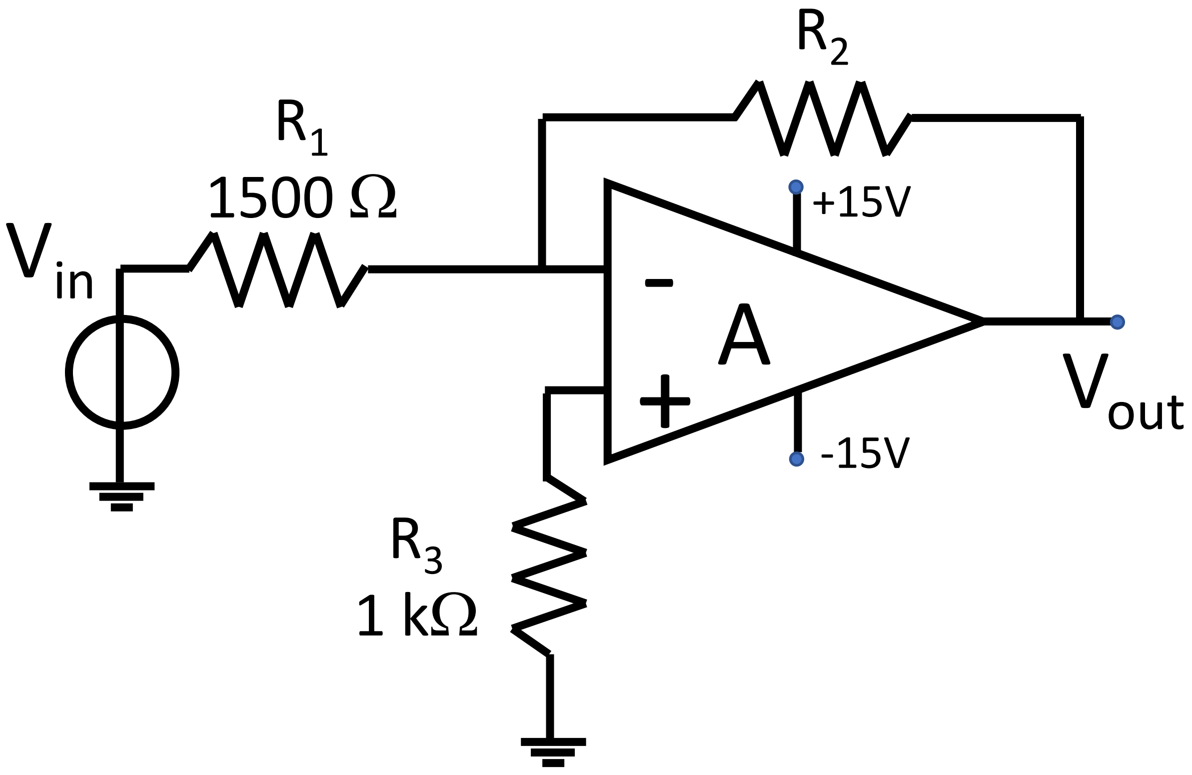
c) Find the loop gain of the circuit when the OpAmp that you have selected has A=750 ?

d) If A varies by 60%, what would be the variation in the gain of the amplifier ?

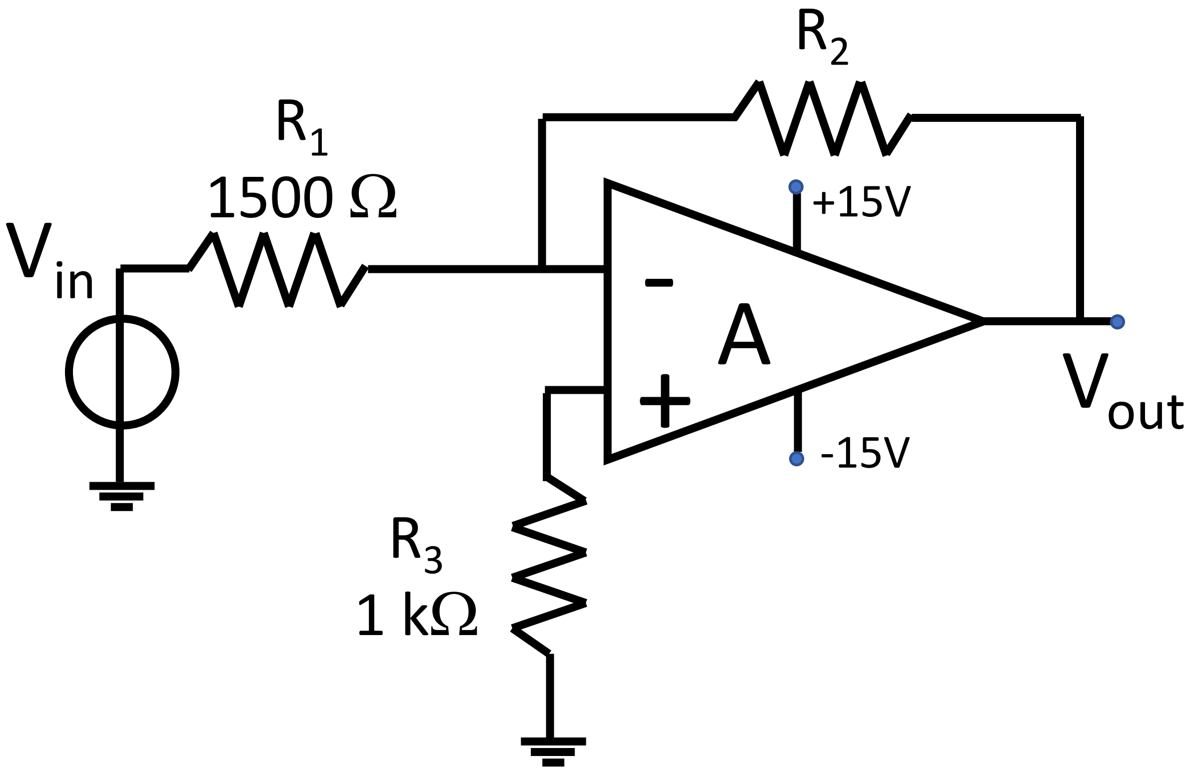
a) Find the value of R2 in order to have an ideal Gain ($A=\infty$) equal to G=-6



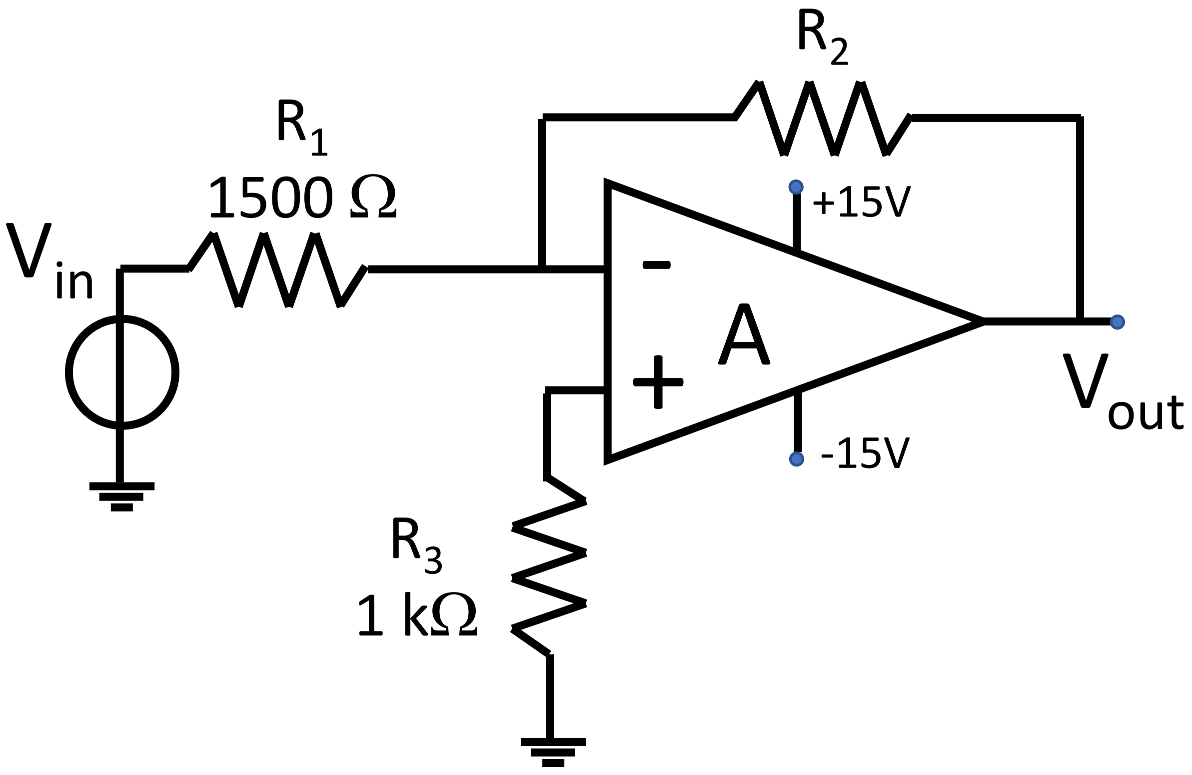
b) How does R3 play a role in the gain ?



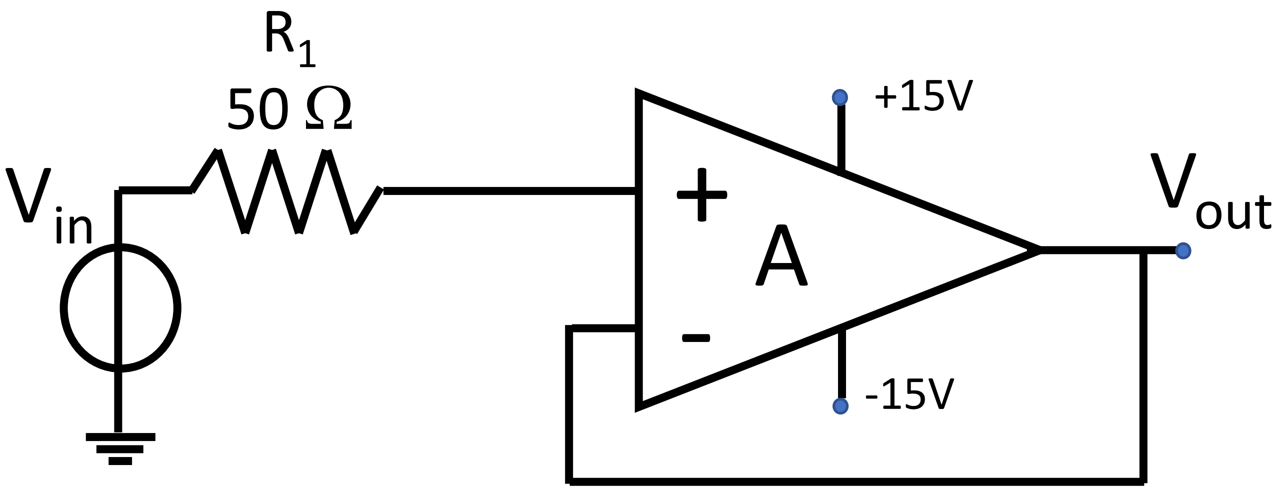
c) Find the loop gain of the circuit when the OpAmp that you have selected has A=750 ?



d) If A varies by 60%, what would be the variation in the gain of the amplifier ?



Exercise (3)

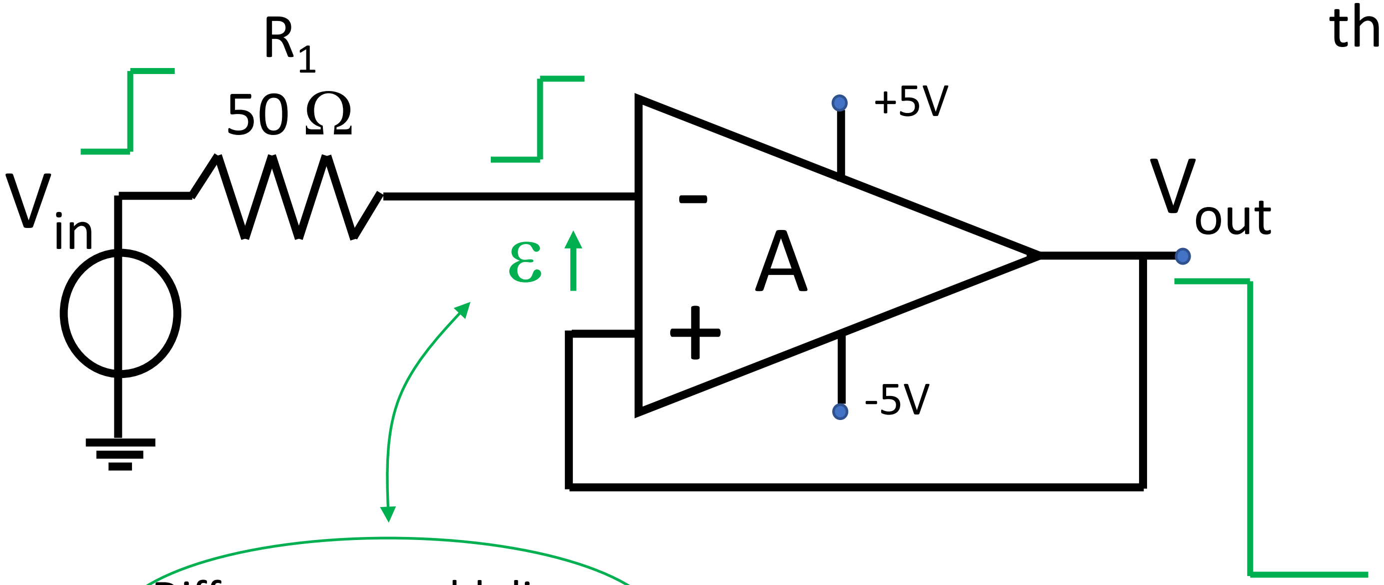


a) What is the ideal Gain ($A=\infty$) of the circuit ?

b) What is the maximum amplitude of a sinusoid that can be applied to the input ?

Exercise (4)

If a signal of V_{in}=+10mV is applied to the input, what would be V_{out} ?



Difference would diverge toward bigger values.

If A=big, then also the output tends to diverge negative, till saturation to -5V

ELECTRONIC SYSTEMS and TECHNOLOGIES

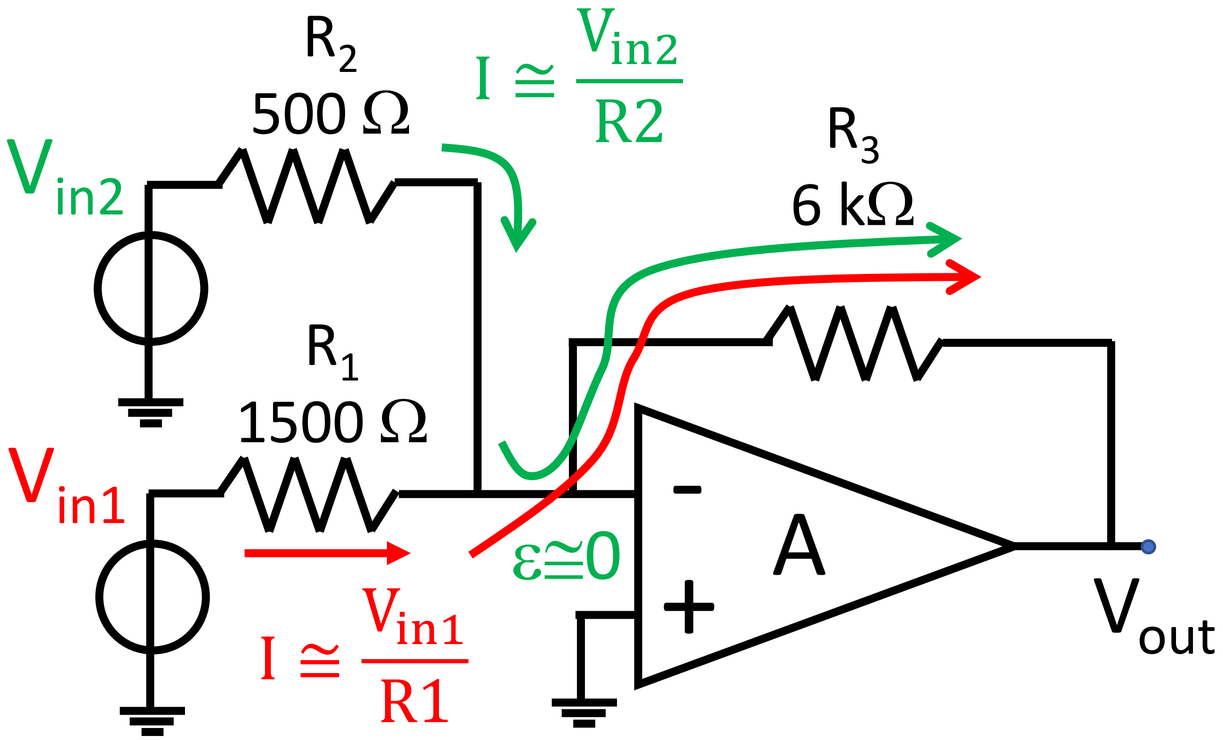
Master in Management Engineering

Prof. Marco Sampietro

GROUND CONCEPTS ON ELECTRONICS

Analog Operations with an OpAmp

Summing amplifier

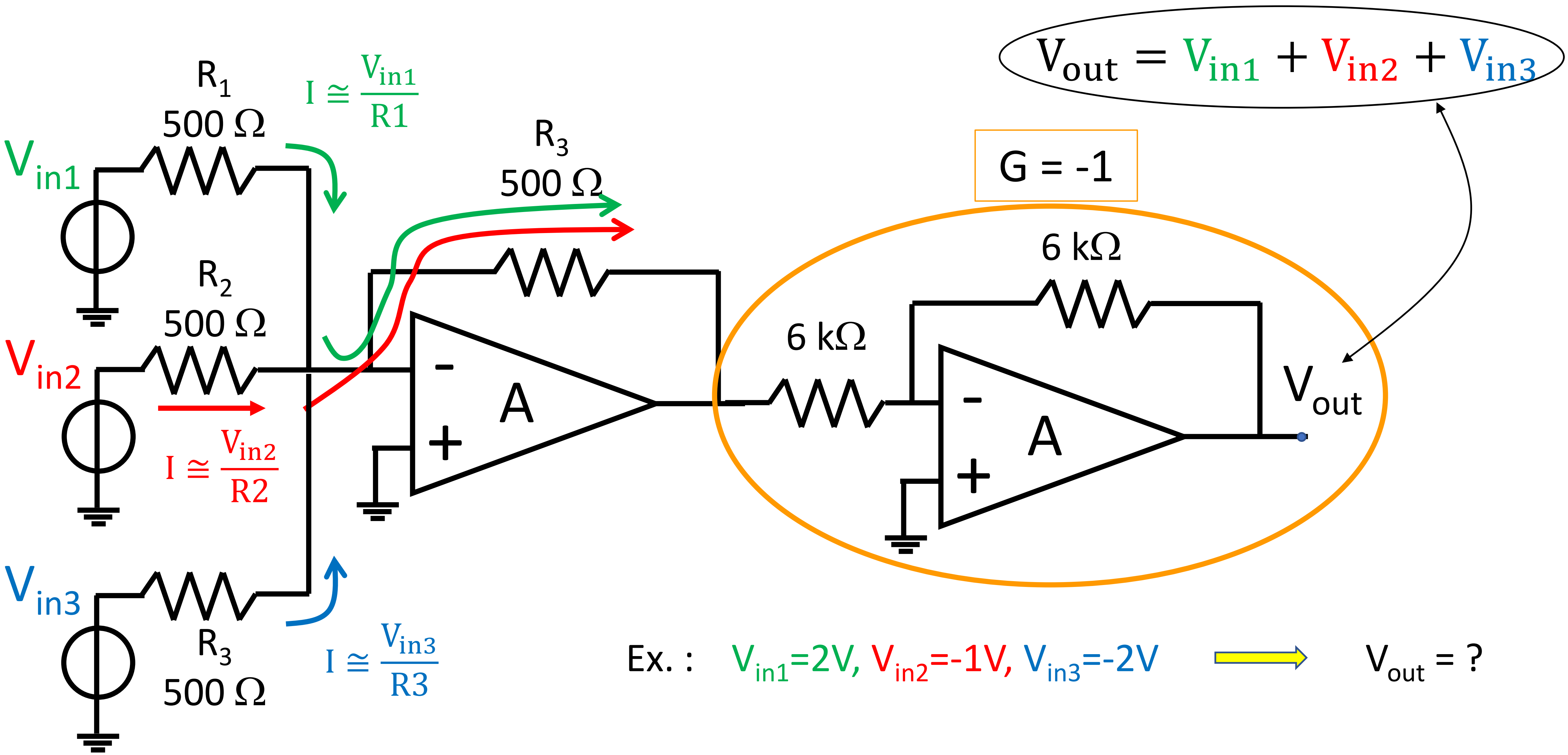


$$V_{out} = -\frac{V_{in1}}{R1} \cdot R3 - \frac{V_{in2}}{R2} \cdot R3$$

Ex. : V_{in1}=80mV and V_{in2}=248mV ⟹ V_{out} = ?

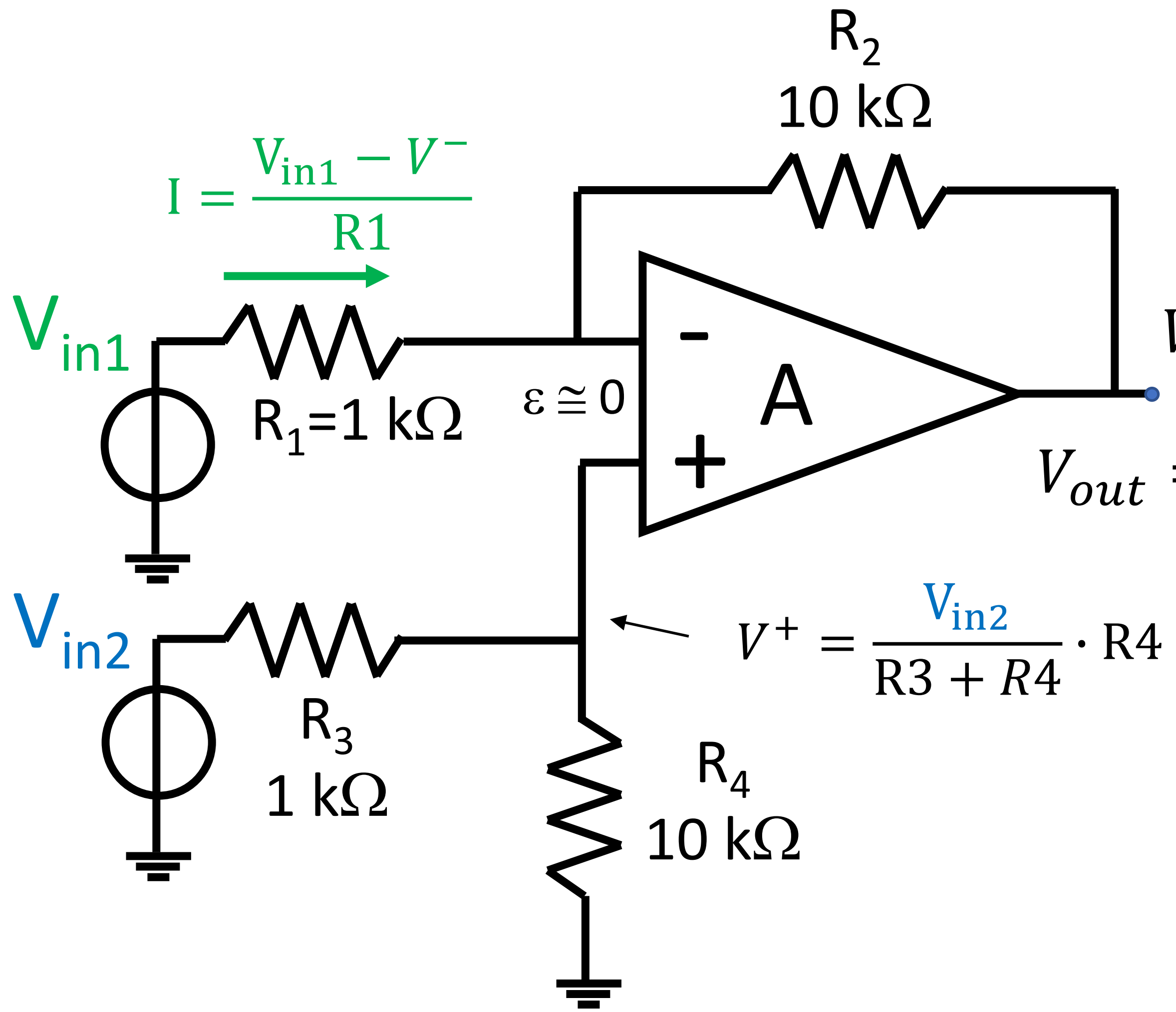
Ex. : V_{in1}= -500mV and V_{in2}=38mV ⟹ V_{out} = ?

Summing amplifier (positive sum)



Ex. : V_{in1}=2V, V_{in2}=-1V, V_{in3}=-2V ⇒ V_{out} = ?

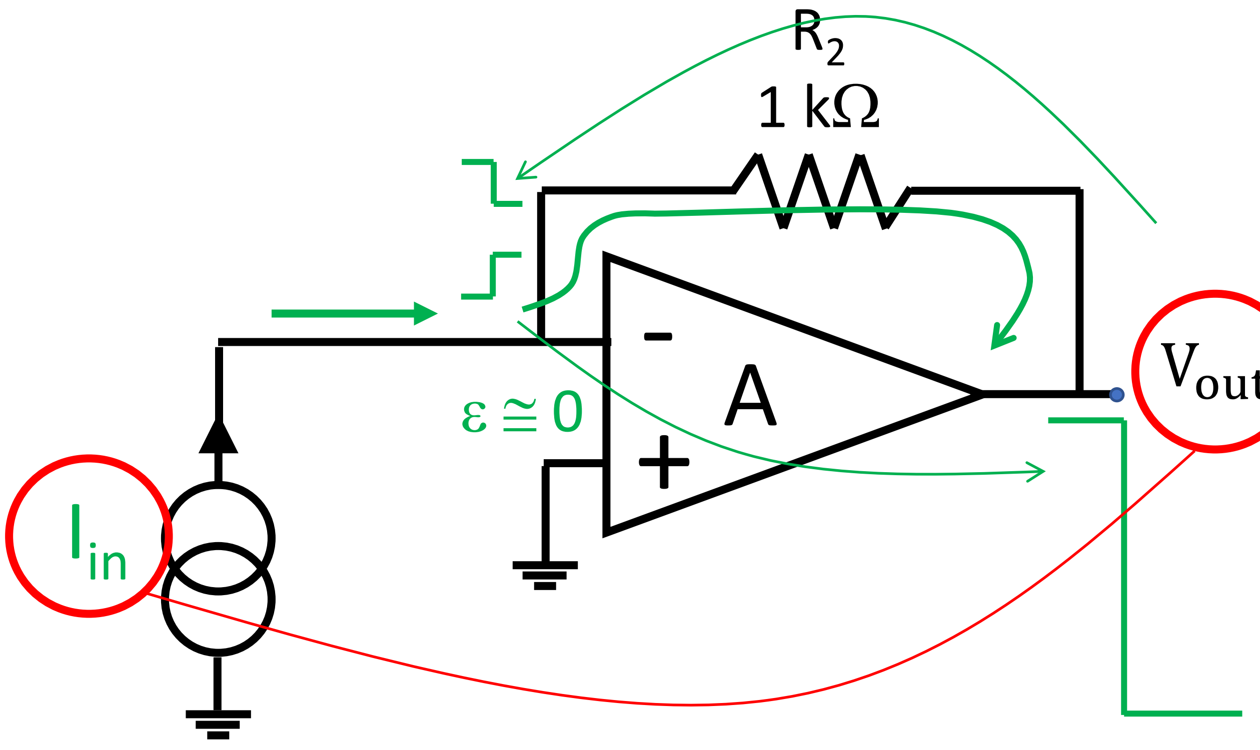
Difference amplifier



$$V_{out} = V^{-} - I \cdot R2$$

$$V_{out} = \frac{\mathrm{V_{in2}}}{\mathrm{R3} + R4} \cdot \mathrm{R4} - \frac{\mathrm{V_{in1}}}{\mathrm{R1}} \cdot \mathrm{R2} + \frac{\mathrm{V_{in2}}}{\mathrm{R3} + R4} \cdot \mathrm{R4} \cdot \frac{R2}{R1}$$

Current to Voltage converter



$V_{out} = -I_{in} \cdot R2$

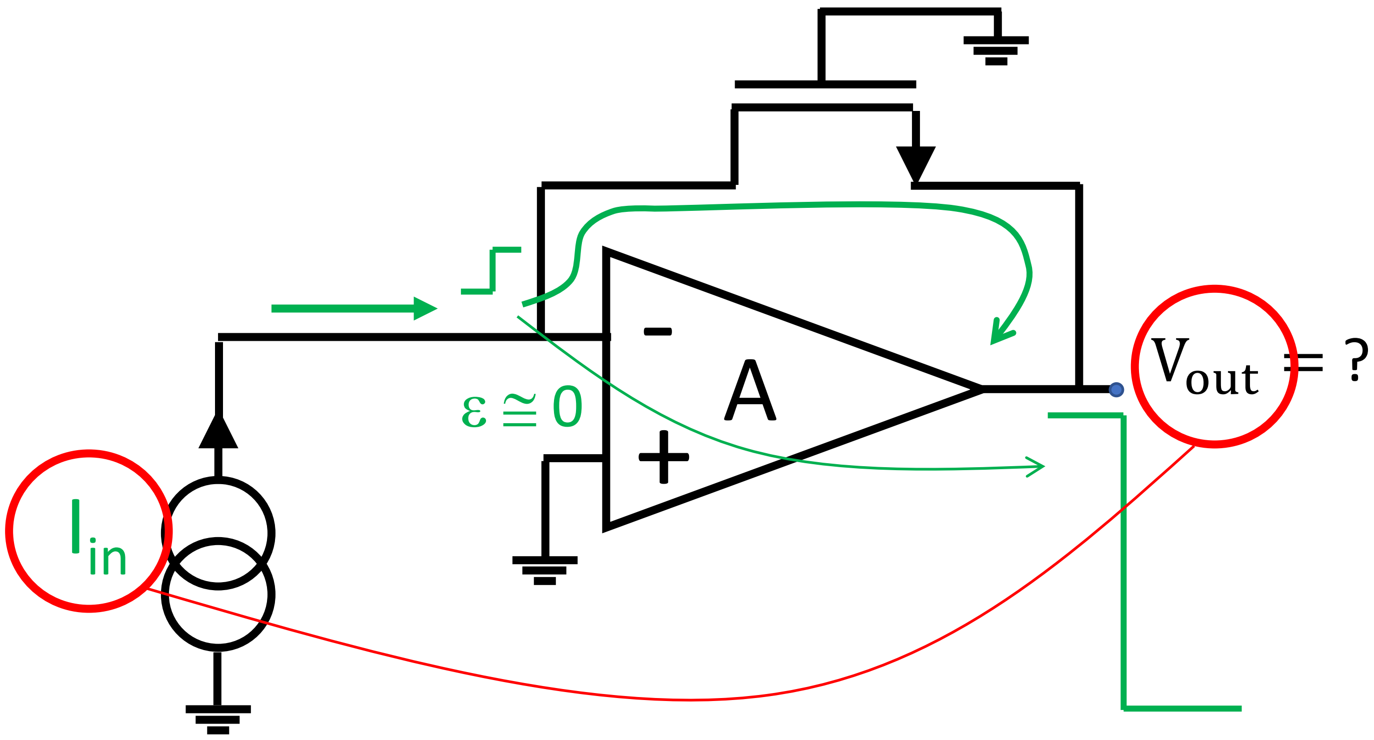
$$\frac{V_{out}}{I_{in}} = -R2$$

It has the dimension of a resistance

TRANSRESISTANCE GAIN of the Transresistance Amplifier

Ex. : I_{in}=1mA ⟹ V_{out} = ?

Square root operator



Ex. : I_{in}=1mA ⟹ V_{out} = ?

End of the lesson