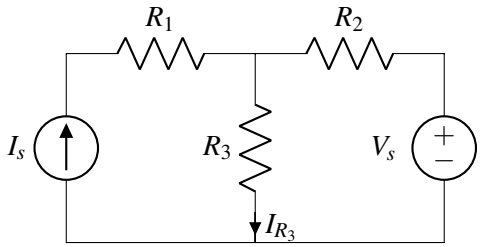
EECS 16A Designing Information Devices and Systems I
Fall 2021 Discussion 12A

1. Superposition

Consider the following circuit:



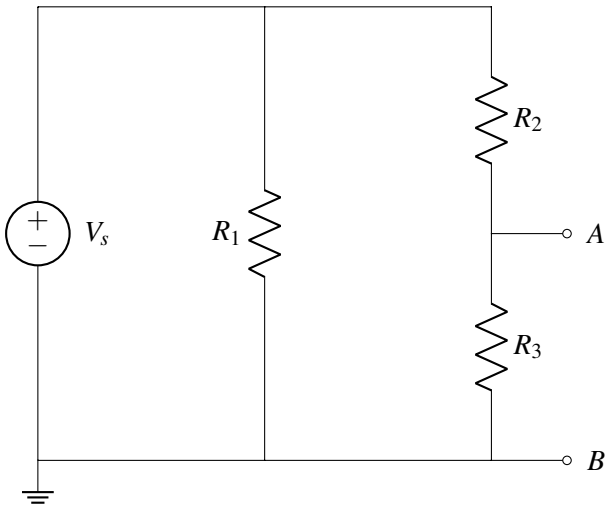
(a) With the current source turned on and the voltage source off, find the current I_{R_3}.

(b) With the voltage source turned on and the current source turned off, find the voltage drop across R_3, V_{R_3}.

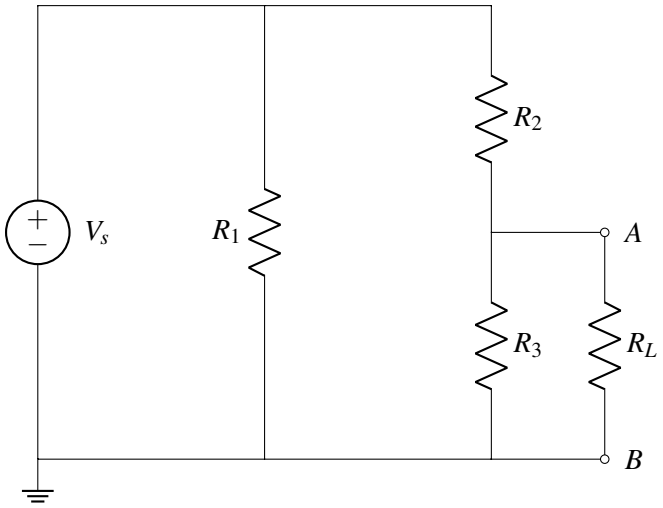
(c) Find the power dissipated by R_3.

2. Thévenin/Norton Equivalence

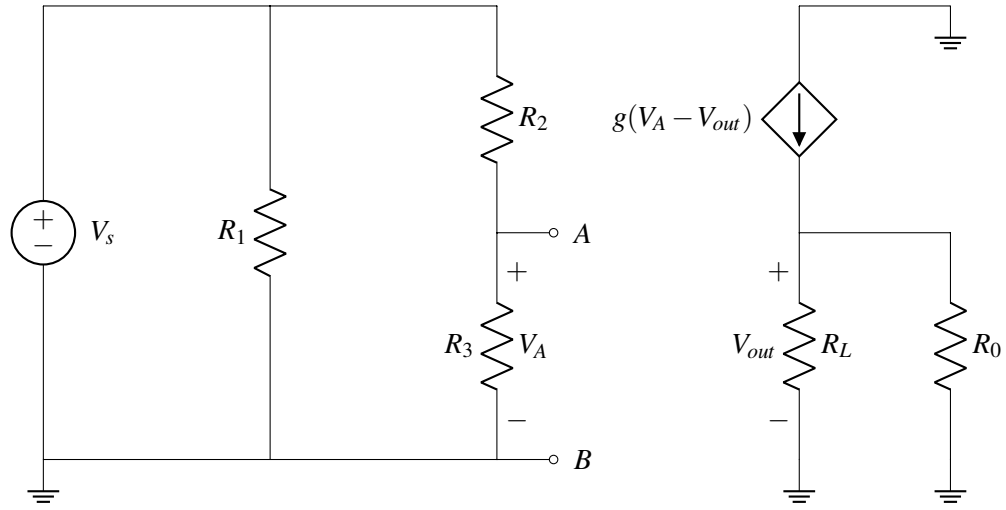
(a) Find the Thévenin resistance R_{th} of the circuit shown below, with respect to its terminals A and B.



(b) Now a load resistor, $R_L = R$, is connected across terminals A and B as shown in the circuit below. Find the power dissipated in the load resistor in terms of given variables.



(c) We modify the circuit as shown below, where g is a known constant:

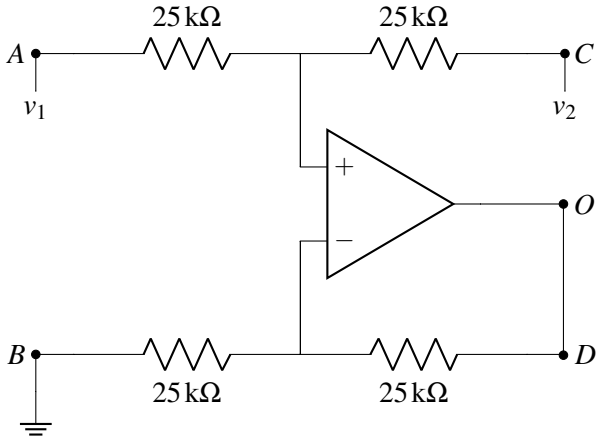


Find a symbolic expression for V_{out} as a function of V_s.
Hint: Redraw the left part of the circuit using with its Thévenin equivalent.

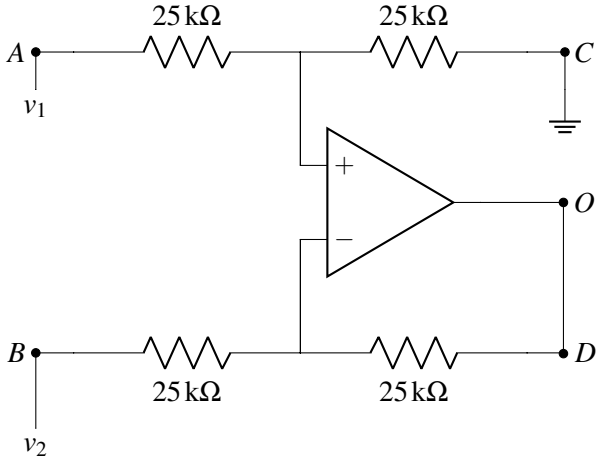
3. A Versatile Opamp Circuit

For each subpart, determine the voltage at O.

(a) Configuration 1:



(b) Configuration 2:



(c) Configuration 3: