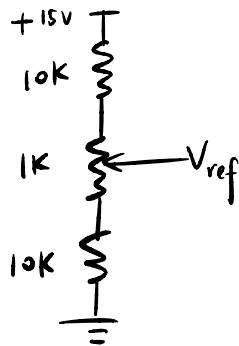


1. (2 points) Calculate the maximum and minimum reference voltages available from the circuit in Figure 8.4.



$$V_{ref, min} = \frac{10k}{10k + 1k + 10k} \cdot 15V = 7.14V$$

$$V_{ref, max} = \frac{11k}{10k + 1k + 10k} \cdot 15V = 7.86V$$

2. (4 points) Suppose the potentiometer is set so that you get maximum voltage. Find the Thevenin voltage and resistance of the reference circuit, looking back into the wiper.

$$V_{th} = 15V \times \frac{1k\Omega + 10k\Omega}{21k\Omega} = 7.86V$$

$$R_{th} = 10k\Omega // 11k\Omega = \frac{10k\Omega \cdot 11k\Omega}{21k\Omega} = 5.24k\Omega$$

3. (4 points) Now suppose the circuit is attached to another circuit with 68kΩ input impedance. Find the new reference voltage.

$$V_{new} = V_{th} \times \frac{R_L}{R_{th} + R_L} = 7.86V \times \frac{68k\Omega}{5.24k\Omega + 68k\Omega}$$

$$= 7.86 \times \frac{68}{73.24} V = 7.30V$$