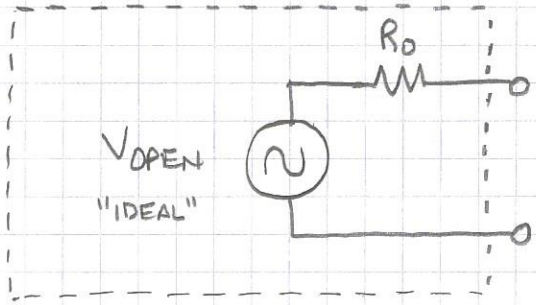
W2AEW

How to Measure Output Impedance

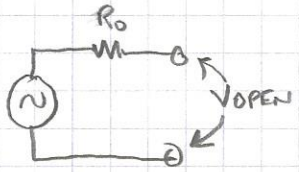


Function Generator, Amplifier, etc.

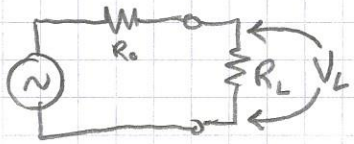
- In general – measure the change in output vs. changing load resistance

- In many cases you can use the "open" & "loaded" case

① Measure "open circuit"



② Measure "loaded" circuit



③ Calculate R_O

$$R_O = R_L \left(\frac{V_{OPEN}}{V_L} - 1 \right)$$

≡ Special case ≡

$V_L = \frac{V_{OPEN}}{2}$ when $R_L = R_O$

You can vary R_L until $V_L = \frac{V_{OPEN}}{2}$ and measure R_L

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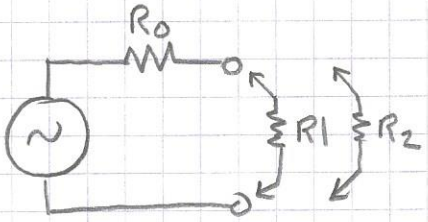
In some cases – this might not work well

- If amplifier/circuit/etc doesn't work well unloaded
- If output impedance changes with big changes in load
- Etc.

– In these cases – measure output with two different loads



$$R_O = \frac{R1 - R1 \cdot \frac{V1}{V2}}{\frac{V1}{V2} - \frac{R1}{R2}}$$