

KVL

KCL

Voltages
meshes

currents
nodes

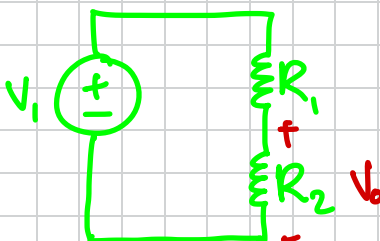
e.g. 2 components share the same current and are in series

KCL
voltage
KVL

parallel

e.g

voltage	↔	current
short	↔	open
parallel	↔	series
mesh	↔	node
outer loop	↔	ground node
across	↔	through



Voltage divider

series

voltage source

output voltage (V_0)

across R_2

↔ current divider

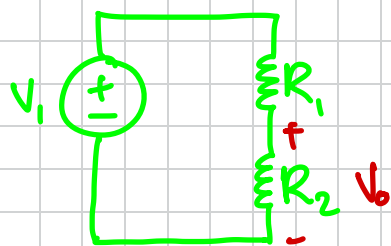
↔ parallel

↔ current source

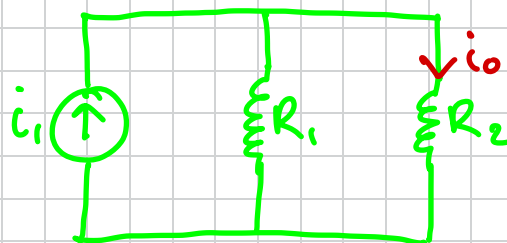
↔ output current

↔ through R_2

e.g



↔



$$V_0 = V_1 \frac{R_2}{R_1 + R_2}$$

$$i_0 = i_1 \frac{R_1}{R_1 + R_2}$$

① $R_1, R_2 \uparrow i \uparrow$
② $G_1, G_2 \uparrow \downarrow$

Series: $R_1 + R_2 + \dots$

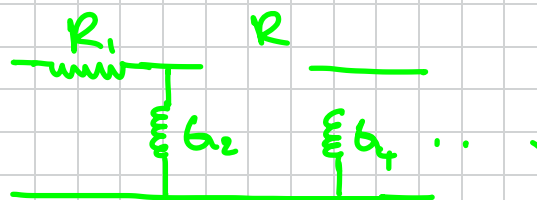
Parallel: $G_1 + G_2 + \dots$

Parallel: Complex
Series: Complex

$$[R] = \frac{V}{A} \leftrightarrow [G] = \frac{A}{V}$$

↓
conductance

Ladder circuit



General Methodology: Given a circuit:

1. Draw nodes inside each mesh; draw one node on the outside
2. Connect the nodes through components; replacing them w/ duals
3. Keep note of polarity by labeling voltage across each component

