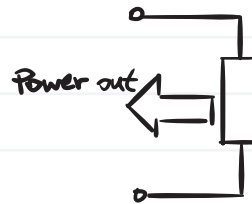
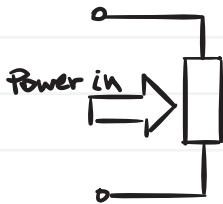


Circuit analysis

Sign convention

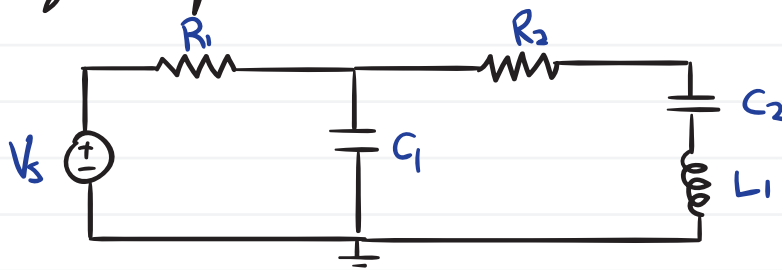
The **passive sign convention** of electrical engineering is used. We consider power **into** a component to be **positive** and power flowing **from** a component to be **negative**.



Because $P = vi$, this implies that the current and voltage signs are prescribed by the convention. The electrical potential must drop in the direction of positive current flow. This means the assumed direction of voltage drop across an element must be the same as that of the current flow.



When analyzing a circuit, for each element, draw an arrow beside it pointing in the direction of assumed current flow and voltage drop. For instance,



Analysis of a circuit

After preliminaries (e.g. diagram, sign convention), analysis of a circuit begins with the writing of the **elemental equations** for all the elements.

The next step is to write the **continuity** and **compatibility equations** of Kirchhoff. Around each loop, apply Kirchhoff's voltage law. For each node, apply Kirchhoff's current law.

The resulting system of algebraic and differential equations can be solved for given inputs and initial conditions.

Example Given the RC-circuit below with $V_s = 12V$ after $t=0$ and $v_C(t)|_{t=0} = 0$, what is $v_C(t)$?

