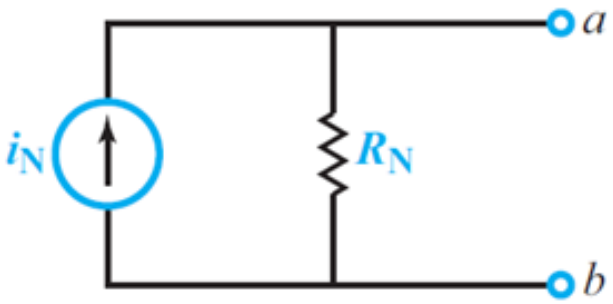
Outline

- Linearity property
- Superposition
- Thevenin's theorem
- Norton's theorem
- Source transformation
- Power transfer

Norton's Theorem

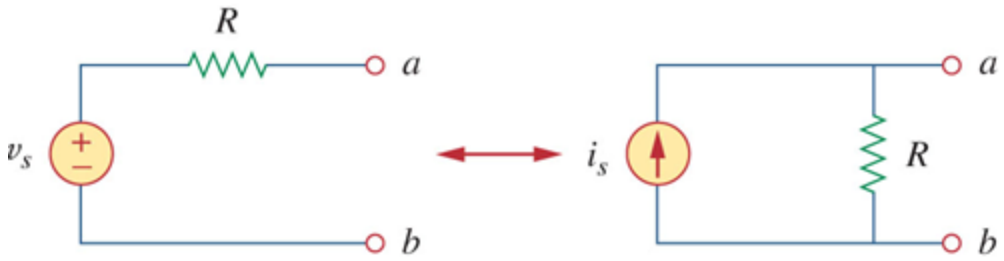
Norton's theorem states that all linear circuits can be simplified to an equivalent circuit with a single current source in parallel with a single resistor connected to a load.

Norton equivalent circuit



[Source: Berkeley]

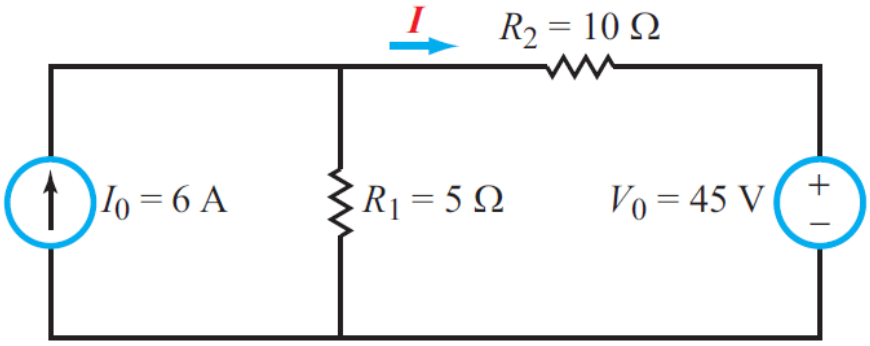
Source Transformation



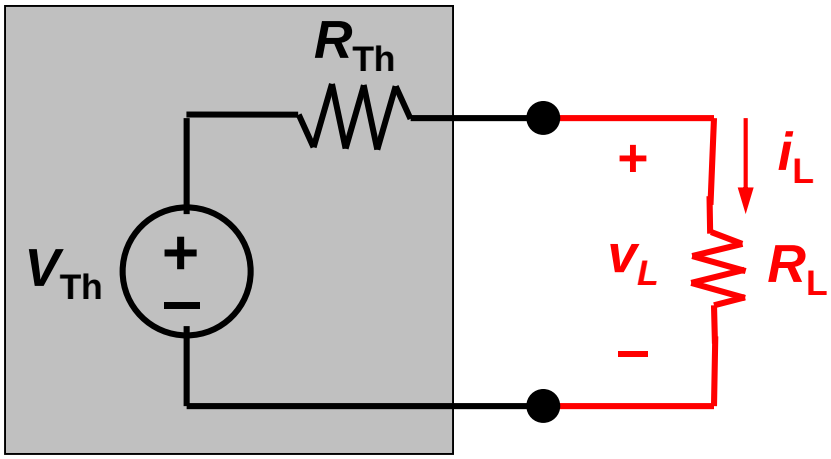
- A source transformation is the process of replacing "a voltage source v_s in series with a resistor R" **by** "a current source i_s in parallel with a resistor R", or vice versa. $\boldsymbol{V_s/i_s = R}$

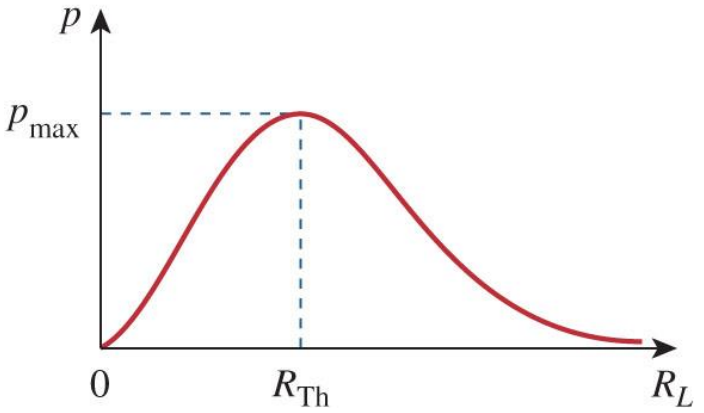
- These transformations work because the two sources have equivalent behavior at their terminals:
  - If the sources are turned off, resistance at the terminals are both R
  - If the terminals are short circuited, the currents is the same.

- Q1: If $R_2 = 1\Omega, I =$?
- Q2: What if $R_2 = 5\Omega$?

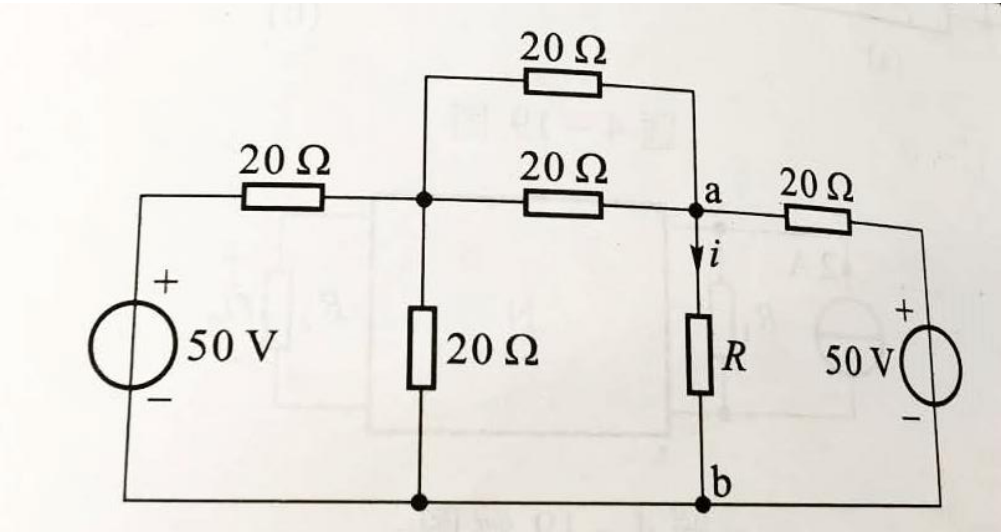


Max Power Transfer





Example



(1) Calculate the value of R, at which maximum power transferred to R holds.

(2) Calculate the percentage/ratio: P_R/P_{total}