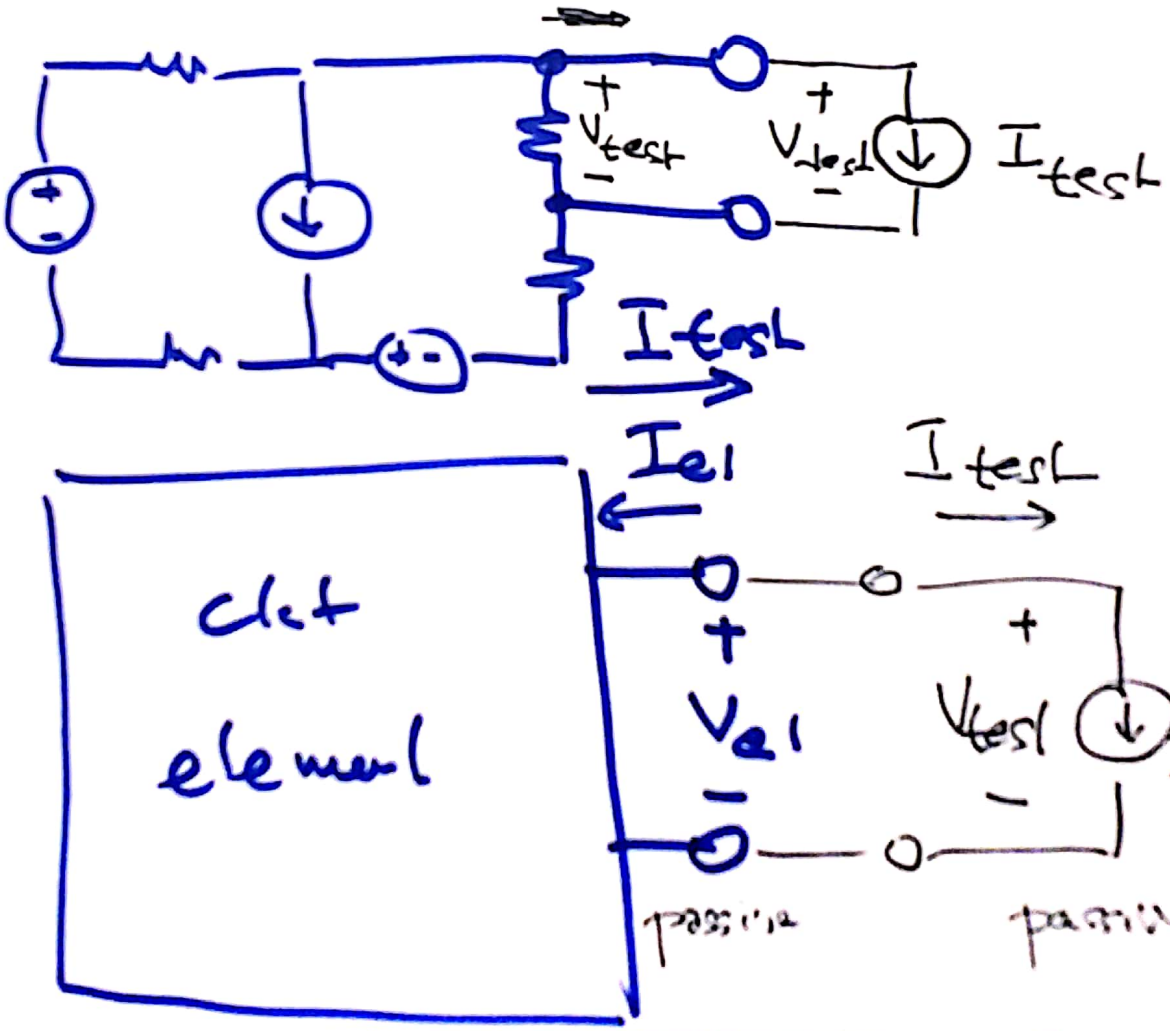
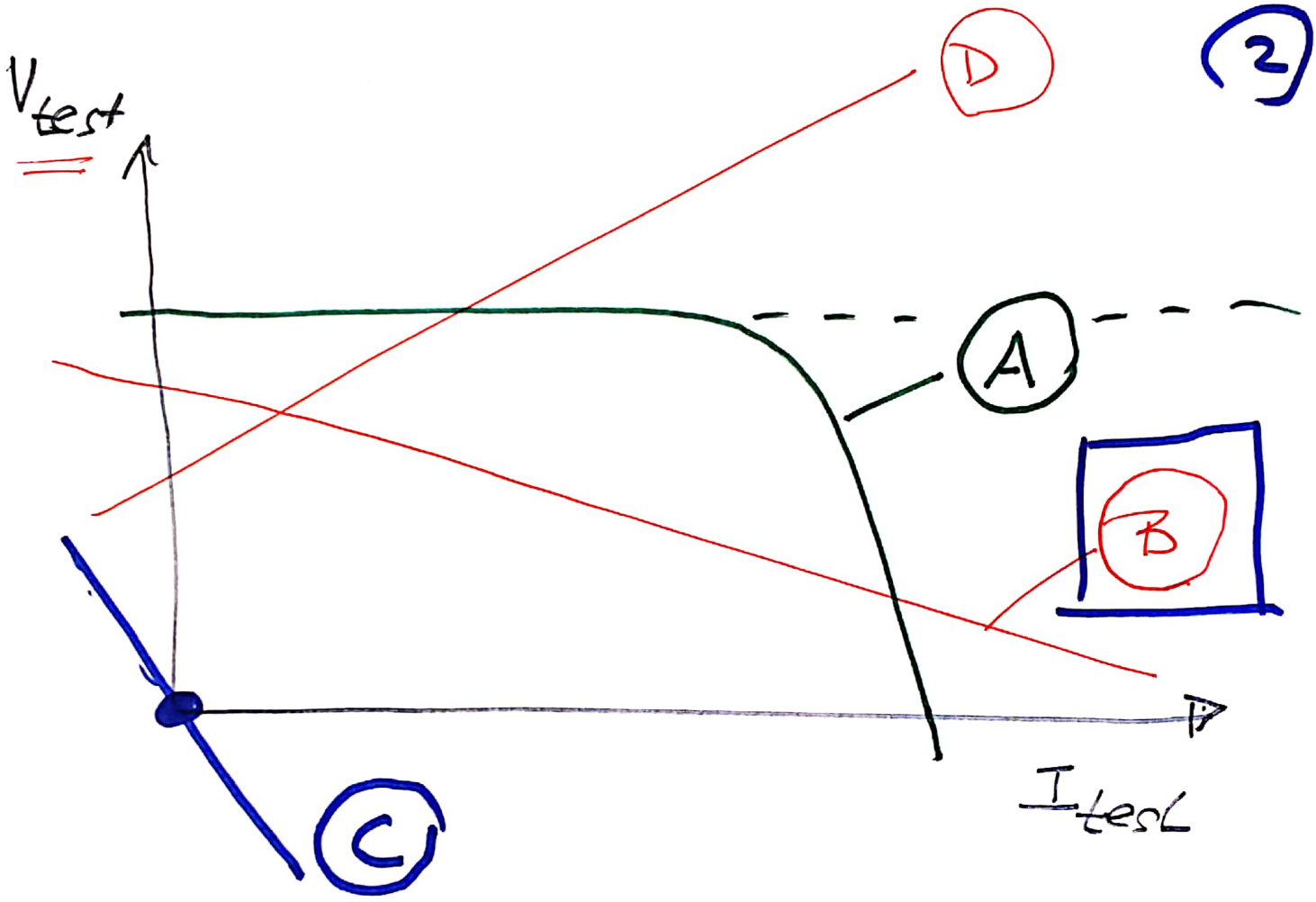
Lecture 5, Module 2

- Thévenin & Norton Equivalents
- Capacitors

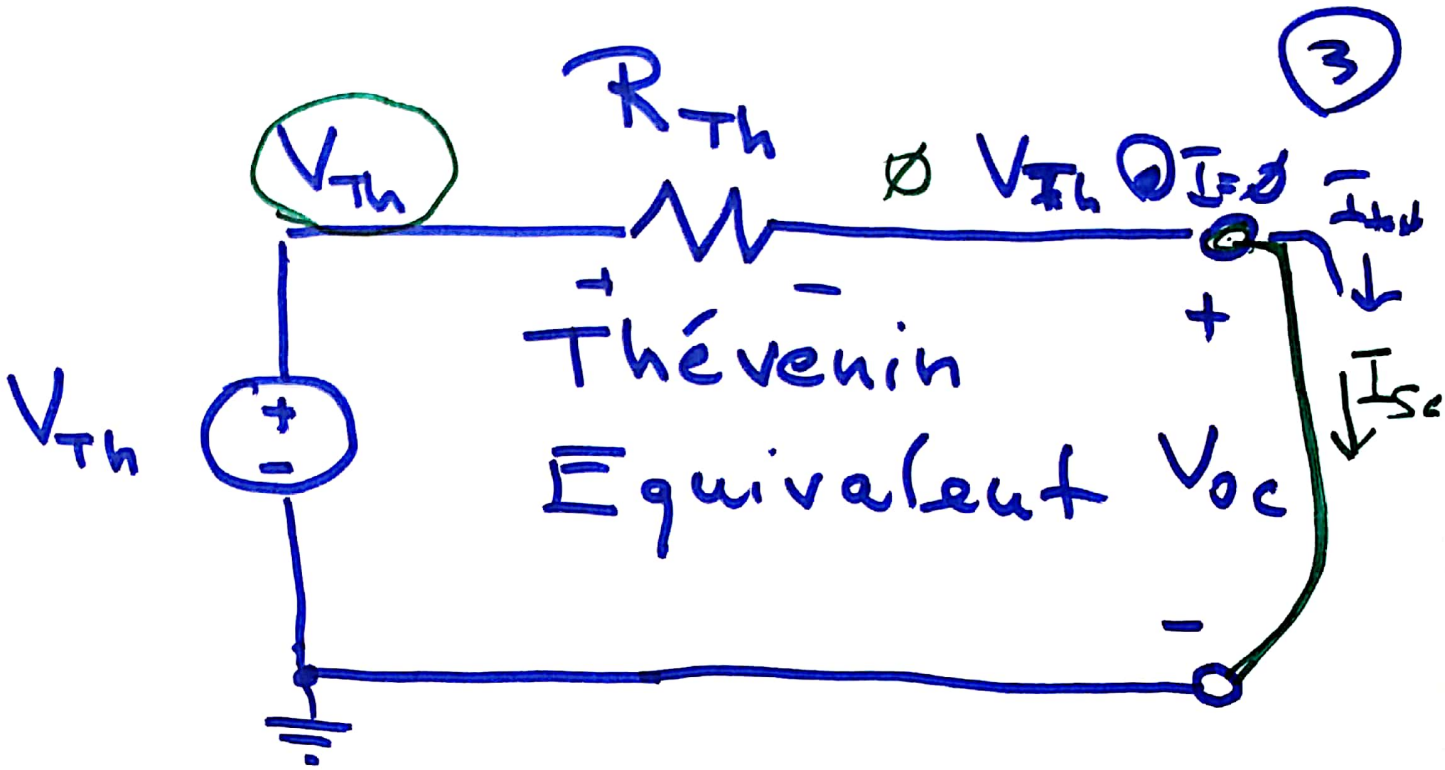


$$I_{el} = -I_{test}$$

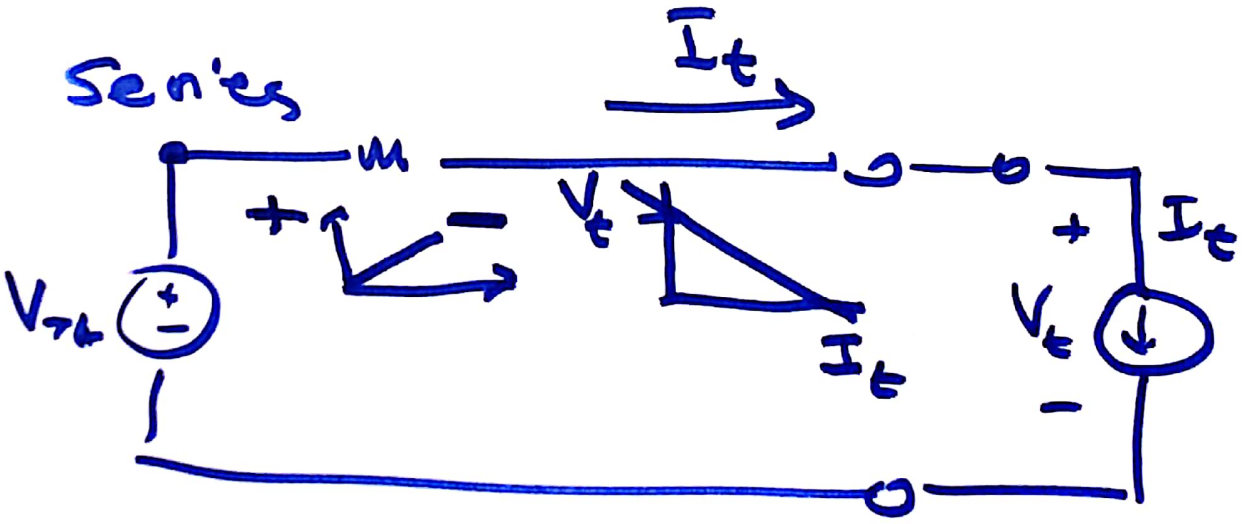


$\cdot A^{-1}$ | $A \cdot \vec{v_n} = \vec{b}$

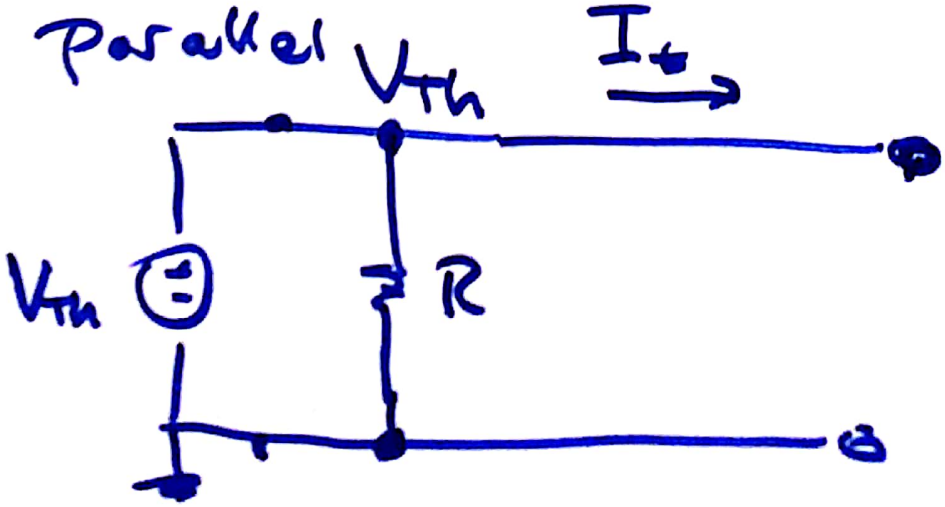
$$\vec{v_n} = A^{-1} \cdot \vec{b}$$

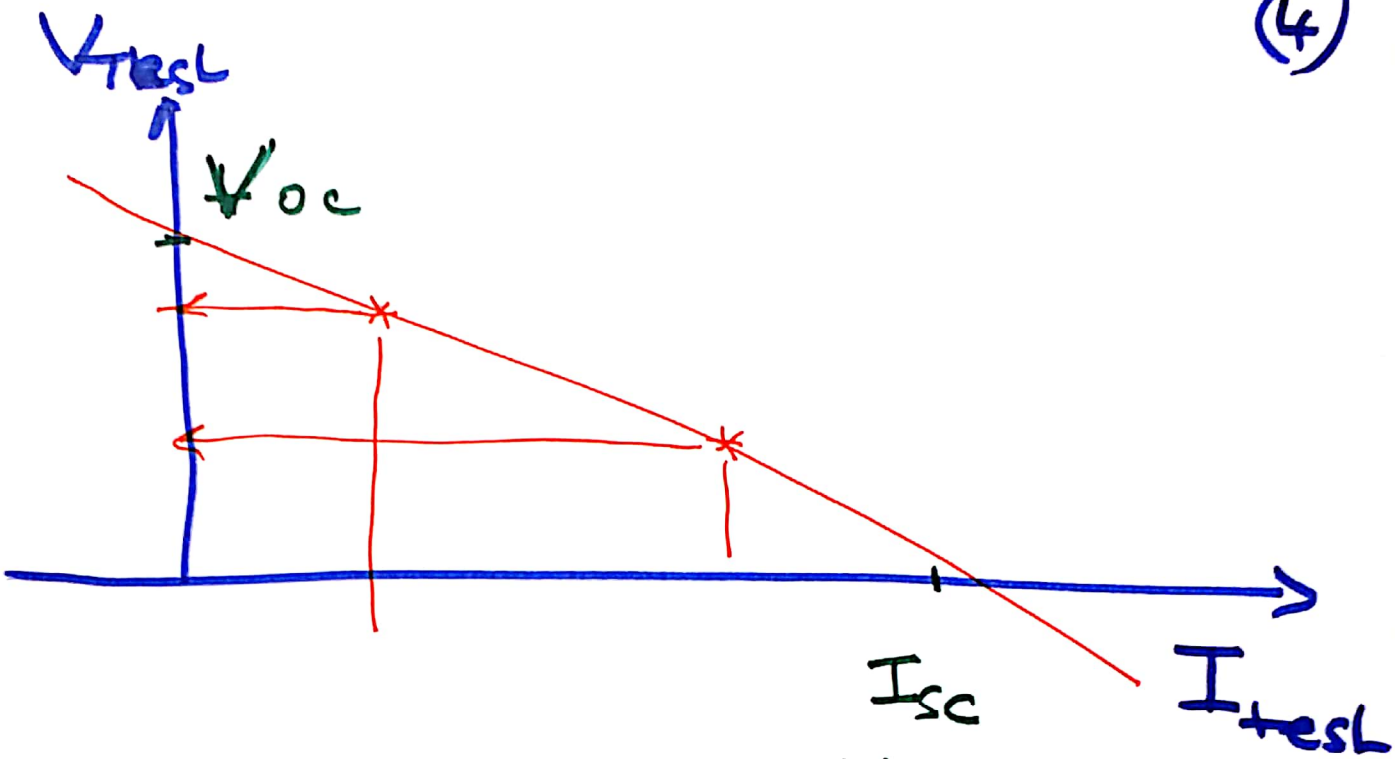


a) Series



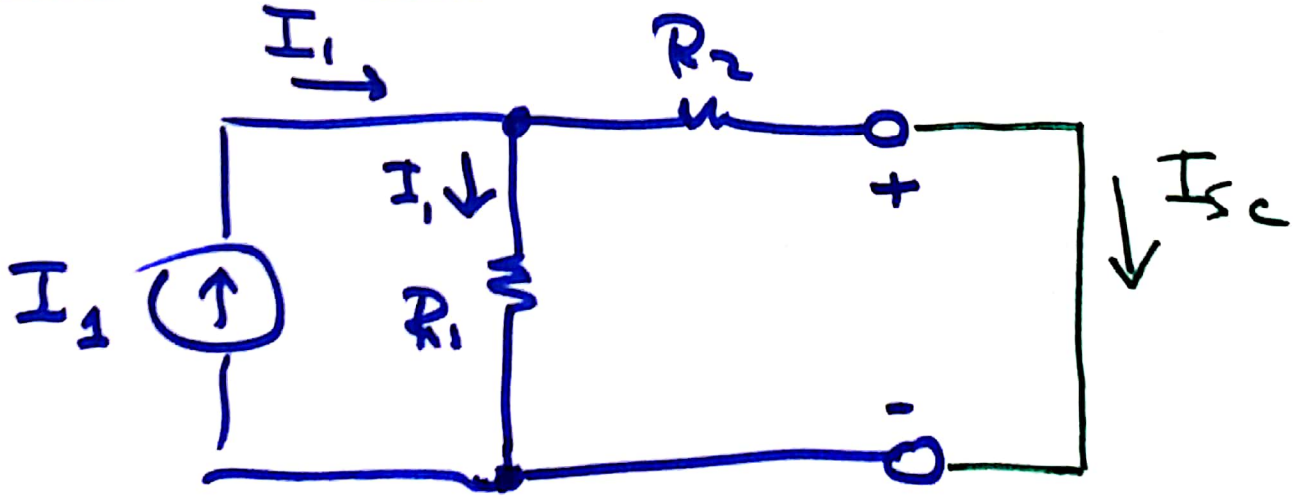
b) Parallel





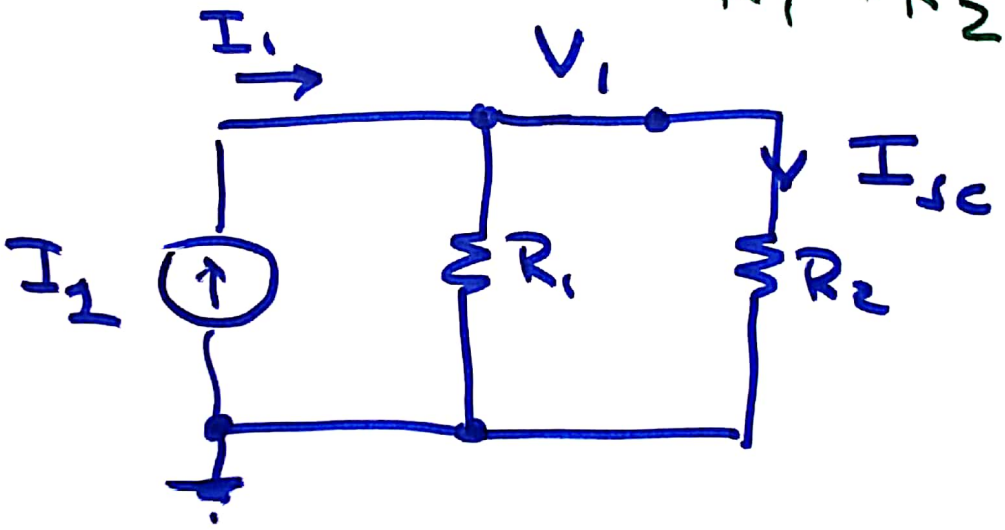
$$= \frac{V_{Th}}{R_{Th}}$$

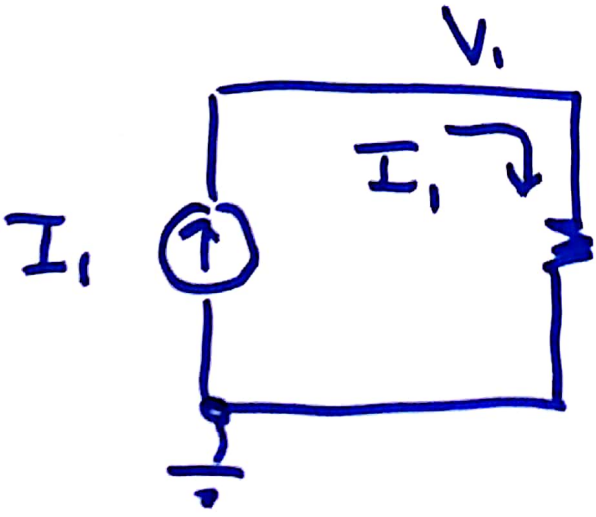
Example :



(a) $V_{oc} = R_1 \cdot I_1$

(b) $I_{sc} = I_1 \cdot \dfrac{R_1}{R_1 + R_2}$



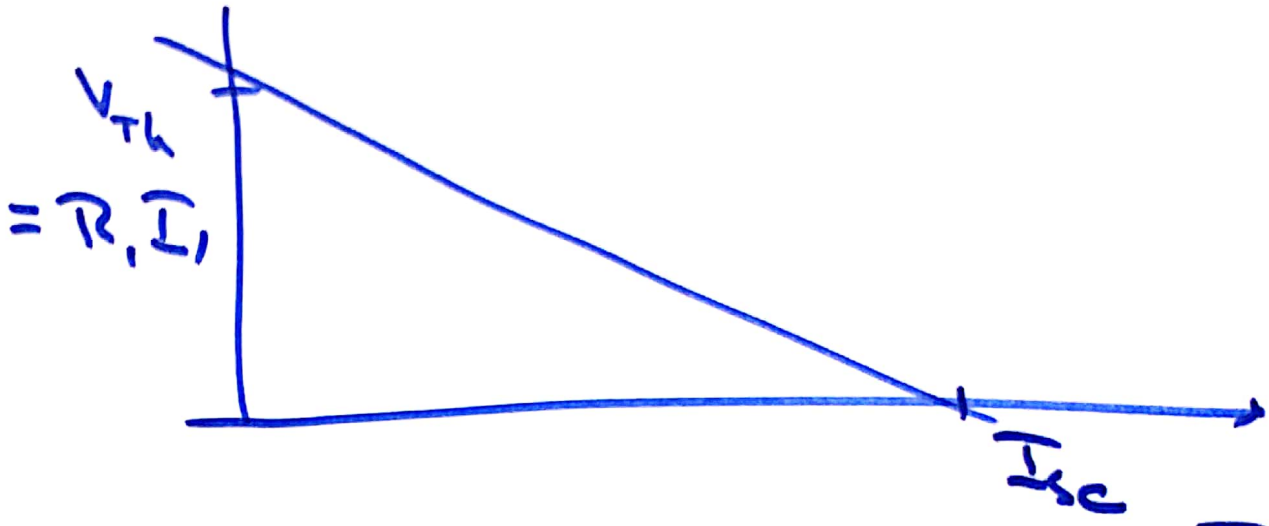


$R_3 = R_1 // R_2$

$= \dfrac{2 \cdot R_2}{R_1 + R_2}$

$V_1 = I_1 \cdot R_3$

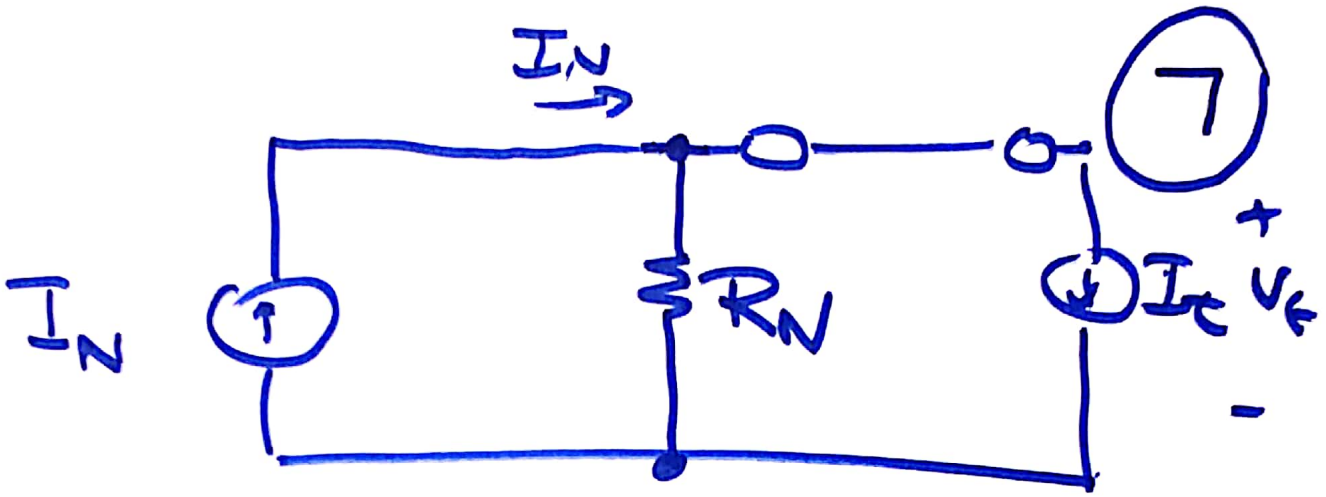
$$\boxed{I_{sc} = \frac{V_1}{R_2} = I_1 \frac{R_1}{R_1 + R_2}}$$



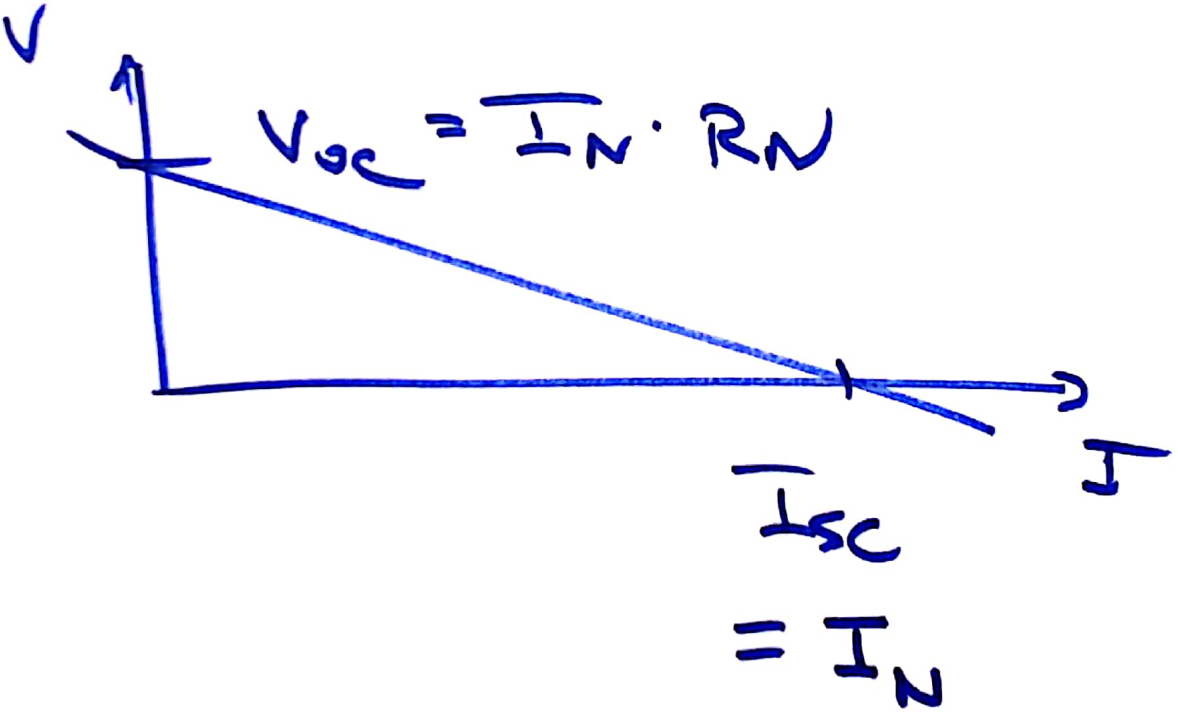
$$V_{Th} = R_1 \cdot I_1$$

$$R_{Th} = \frac{V_{Th}}{I_{sc}} = \frac{\cancel{R_1 \cdot I_1}}{\cancel{I_1} \cdot \frac{R_1}{R_1 + R_2}}$$

$$= R_1 + R_2$$

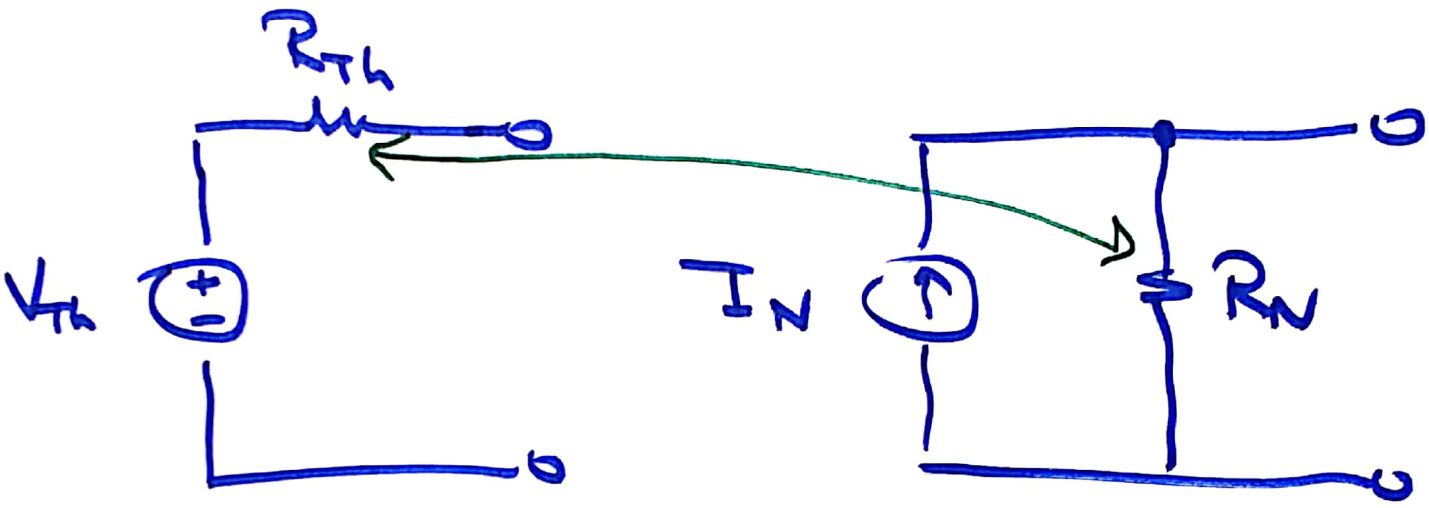


Norton Equivalent



Thévenin

Norton



$$V_{OC} = V_{TH} \quad = \quad V_{OC} = I_N \cdot R_N$$

$$I_{SC} = \frac{V_{TH}}{R_{TH}} \quad = \quad I_{SC} = I_N$$

$$\boxed{V_{TH} = I_N \cdot R_N}$$

$$R_N = \frac{V_{TH}}{I_N} = R_{TH}$$

$$\frac{V_{TH}}{R_{TH}} = I_N \rightarrow V_{TH} = I_N \cdot R_{TH}$$

$$V_{TH} = I_N \cdot R_N$$

Ckt Analysis Techniques

- KVL, KCL
- Ohm's Law

] Basics

- NVA ~~MOC~~

] Procedure universal

- Equivalence
  - Resistors : series, //
  - Théven in, Norton Equivalents
- Superposition
  - Analysis
  - Linear superposition