

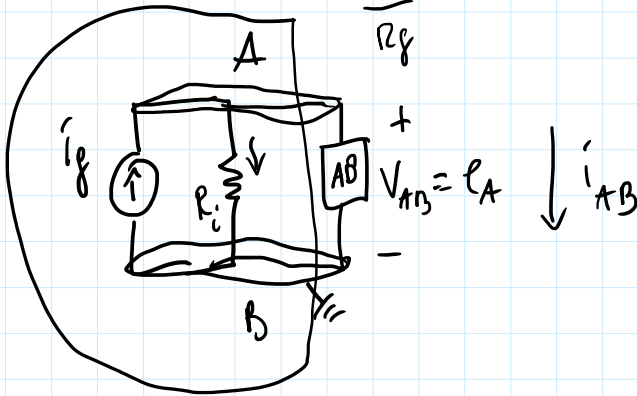
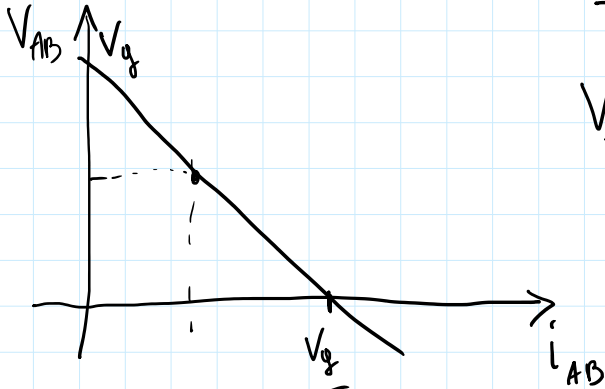
$$-V_g + V_{R_g} + V_{AB} = 0$$

$$\parallel$$

$$i_{AB} \cdot R_g$$

$$-V_g + i_{AB} \cdot R_g + V_{AB} = 0$$

$$V_{AB} = V_g - i_{AB} R_g$$



$$-i_g + i_{R_i} + i_{AB} = 0$$

$$\parallel$$

$$+ \frac{V_{AB}}{R_i}$$

$$\frac{V_{AB}}{R_i} = i_g - i_{AB}$$

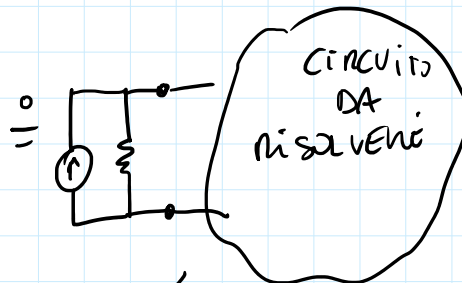
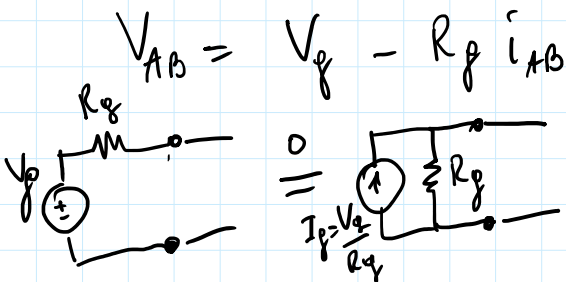
$$V_{AB} = R_i \cdot i_g - R_i \cdot i_{AB}$$

$$\parallel$$

$$\underline{R_i = R_g}$$

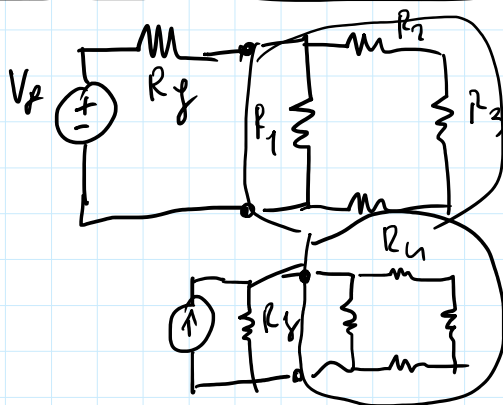
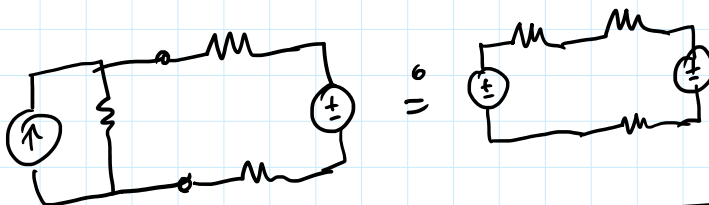
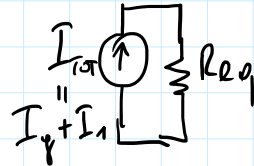
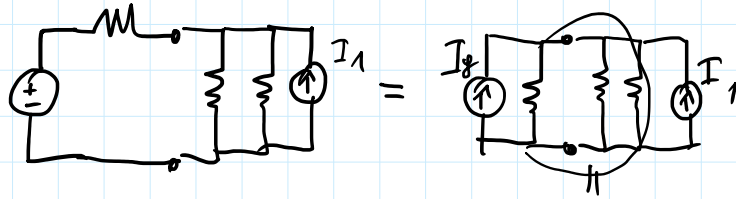
$$i_g = \frac{V_g}{R_g}$$

$$V_g = i_g \cdot R_g$$

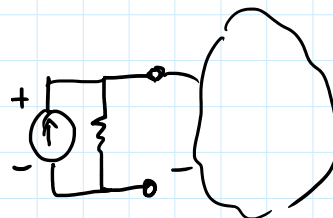
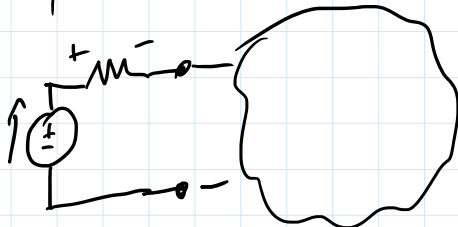
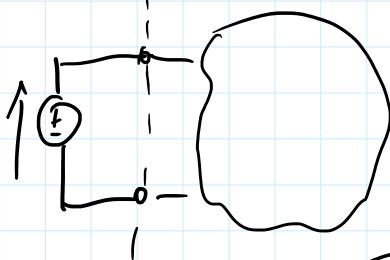


TUTTE LE
TENSIONI E LE CORRENTI

ALL'INTERNO DELLA PARTE
NON SOSTITUITA
SONO INALTERATE



$$\frac{P'}{R_g} \neq \frac{P''}{R_g}$$

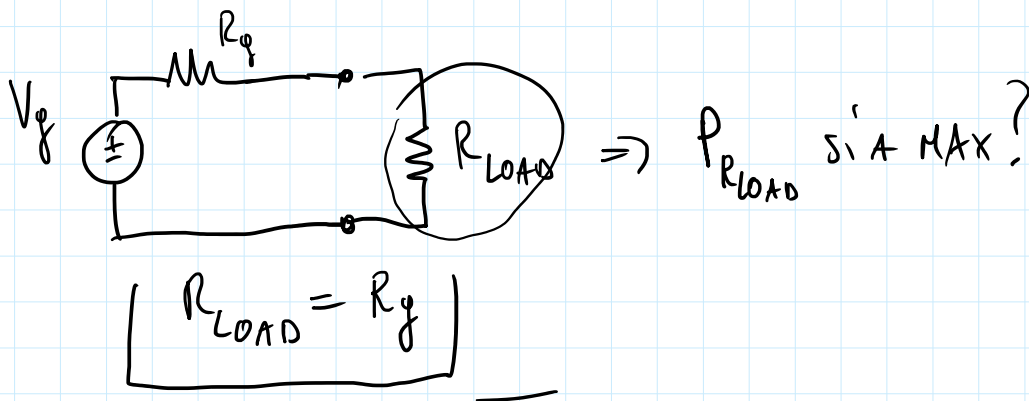


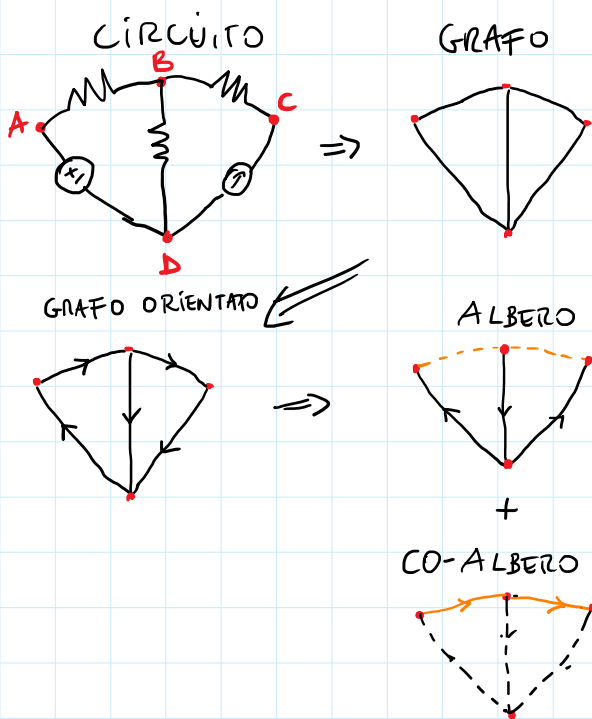
GEN. REALI :

$$\text{POTENZA ERGATA (AL RESO)} = \text{POT. GENERATA} - \text{POT. ASSORBITA DALLA RESISTENZA INTERNA}$$

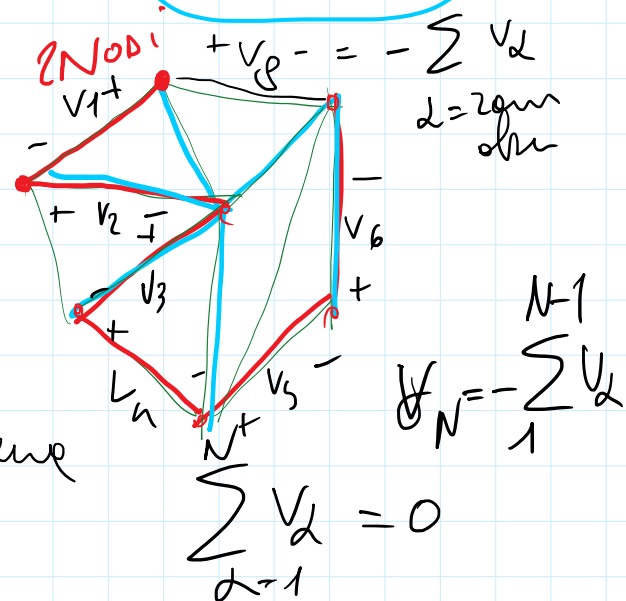
(AL RESO) (V. del generatore)

$$\begin{aligned}
 \text{POTENZA ERGATA} &= \text{POT. GENERATA} - \text{POT. PERSESE IN DUE} \\
 (\text{AL RESTO DEL CIRCUITO}) & \left(\begin{array}{l} V.i \text{ del} \\ \text{generatore} \\ \text{conv. potenza} \end{array} \right) \quad \text{RESISTENZA INTERNA}
 \end{aligned}$$





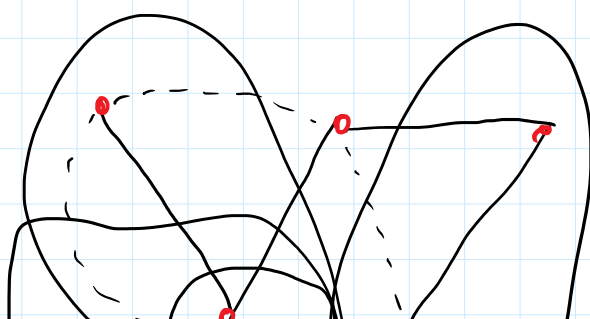
R rami
 N nodi
 $R - N + 1$ rami coalbero
 $N - 1$ rami albero



le tensioni dei rami dell'albero non va insieme indipendente

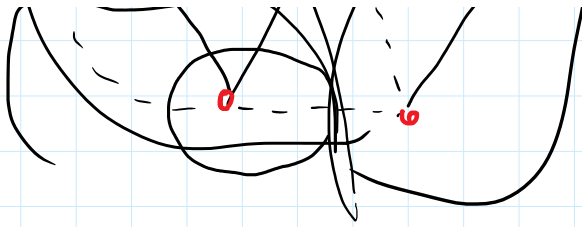
$$V_C(t) = \frac{1}{C} \int_{-\infty}^t i(\tau) d\tau$$

$N - 1 =$ tensioni di ramo indipendenti

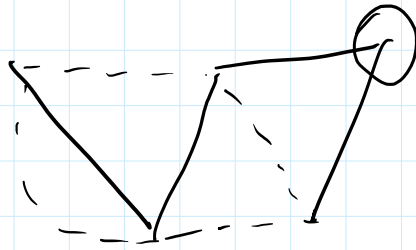


~~$$\sum V_{\alpha} \neq 0$$~~
~~rami coalbero~~

~~$$\sum_{\alpha \in \text{coalbero}} i_{\alpha} = 0$$~~



$$\sum_{\beta \in \text{co-ohes}} \beta = 0$$



le correnti
dei rami del
co-ohes sono
indipendenti.

$$R - (N - 1) = R - N + 1 \text{ rami co-ohes}$$

$$\{ N - 1 \text{ tensioni indip.} = 1$$

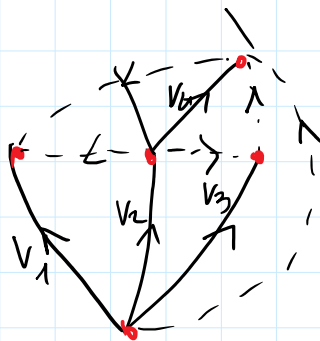
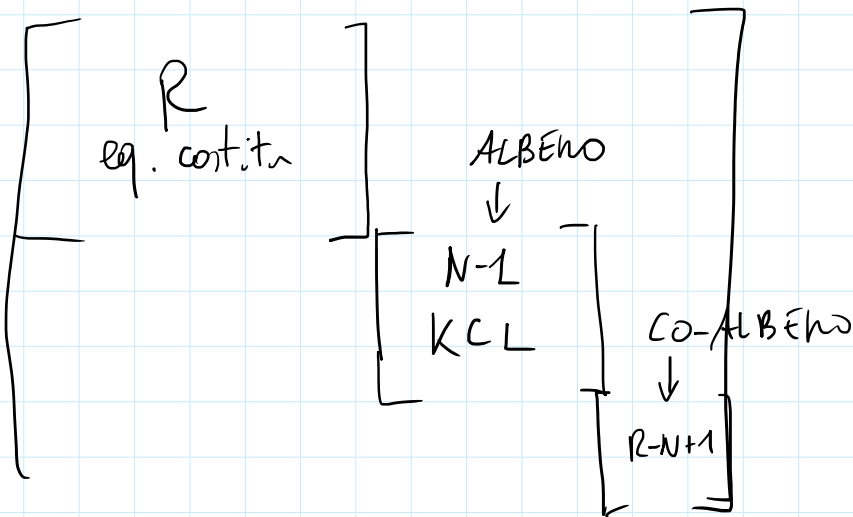
$$\{ R - N + 1 \text{ correnti indipendenti}$$

R eq topologiche indipendenti

$$N - 1 \text{ tensioni ind} \Rightarrow N - 1 \text{ KCL}$$

$$R - N + 1 \text{ correnti ind} \Rightarrow R - N + 1 \text{ KVL}$$

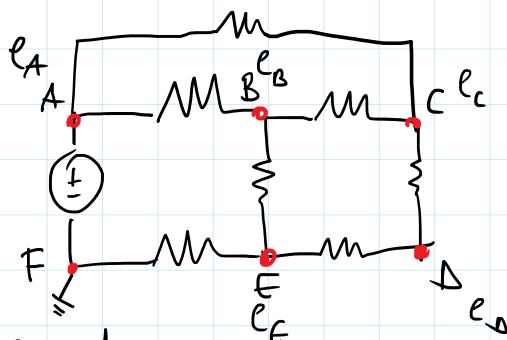
$$\left[\begin{array}{c} 2R \times 2R \end{array} \right] \left[\begin{array}{c} 2R \end{array} \right] = \left[\begin{array}{c} 2R \\ p \\ \Delta \\ R \end{array} \right]$$



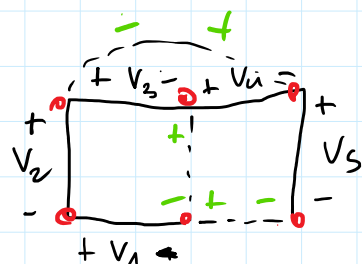
$N-1$ tensioni ind

$R-N+1$ correnti ind

$N-1$ tensioni vincl $\stackrel{\circ}{=} N-1$ potenziali dei nodi



$F = \text{rif. nodo}$



$F = \text{riferimento}$
 \Downarrow

$$e_F = 0$$

$N-1$ potens. incogniti = $(N^\circ \text{ vari. albero})$

$V_1, V_2, V_3, V_4, V_5 = \text{indip}$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & -1 \\ 1 & 0 & 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} e_A \\ e_b \\ e_c \\ e_d \\ e_e \end{bmatrix} = \begin{bmatrix} V_1 \\ V_2 \\ V_3 \\ V_4 \\ V_5 \end{bmatrix}$$

