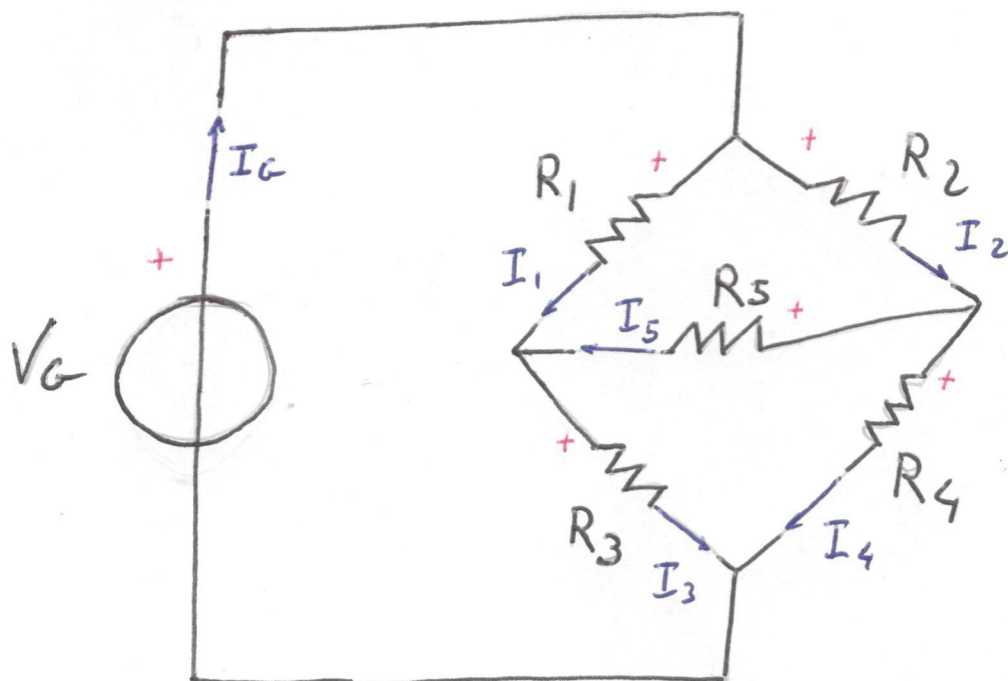


RISOLVERE LA SEGUENTE RETE



DATI I SEGUENTI VALORI :

$$V_G = 10V$$

$$R_1 = 1\Omega$$

$$R_2 = 2\Omega$$

$$R_3 = 3\Omega$$

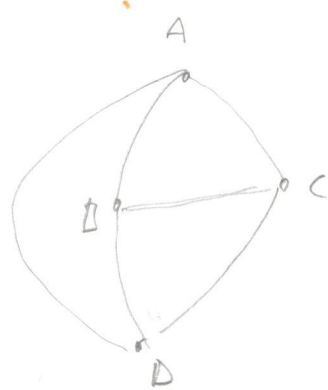
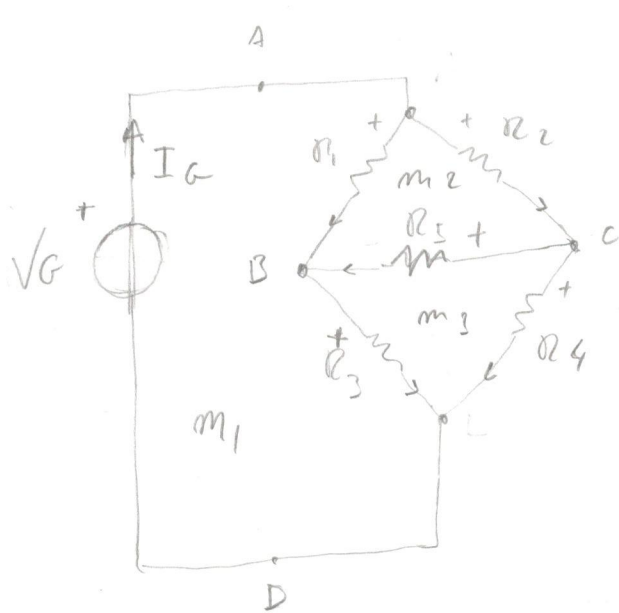
$$R_4 = 4\Omega$$

$$R_5 = 5\Omega$$

METODI POSSIBILI

- 1) EQUAZIONI DI KIRCHHOFF
- 2) TEOREMA DI THEVENIN
- 3) TRASFORMAZIONI $\Delta \rightarrow Y$
- 4)

FINE) VERIFICA TRAMITE BILANCIO DELLE POTENZE



$$\begin{aligned}
 l &= 6 \\
 n &= 4 \\
 m &= l - n + 1 = \\
 &= 6 - 4 + 1 = 3
 \end{aligned}$$

LEGGI DI KIRCHHOFF

SI SCRIVE CON DUE H
E DUE F.

$n-1$ eq. ai nodi
 m eq. alle maglie

$$\begin{aligned}
 A) & \begin{cases} I_G - I_1 - I_2 = 0 \\ I_1 - I_3 + I_5 = 0 \\ I_2 - I_4 - I_5 = 0 \end{cases} \\
 B) & \\
 C) &
 \end{aligned}
 \quad \begin{array}{l} \text{eq. ai} \\ \text{nod} \end{array}$$

$$\begin{aligned}
 m_1) & \begin{cases} V_G - R_1 I_1 - R_3 I_3 = 0 \\ R_1 I_1 - R_2 I_2 - R_5 I_5 = 0 \\ R_3 I_3 - R_4 I_4 + R_5 I_5 = 0 \end{cases} \\
 m_2) & \\
 m_3) &
 \end{aligned}
 \quad \begin{array}{l} \text{eq. alle} \\ \text{maglie} \end{array}$$

6 eq. e 6 incognite $I_G, I_1, I_2, \dots, I_5$

$$\begin{pmatrix} 1 & -1 & -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 0 & 1 \\ 0 & 0 & 1 & 0 & -1 & -1 \\ 0 & +R_1 & 0 & +R_3 & 0 & 0 \\ 0 & R_1 - R_2 & 0 & 0 & 0 & -R_5 \\ 0 & 0 & 0 & R_3 - R_4 & R_5 & 0 \end{pmatrix} \begin{pmatrix} I_0 \\ I_1 \\ I_2 \\ I_3 \\ I_4 \\ I_5 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ V_G \\ 0 \\ 0 \end{pmatrix}$$

SOSTITUISCO R_1, \dots, R_5, V_G CON I LORO VALORI
E RISOLVO IL SISTEMA. USO UN PROGRAMMA DI
CALCOLO SCIENTIFICO PER FARE PRIMA ;)

$$I_0 = 4,177 \text{ A}$$

$$I_1 = 2,588 \text{ A}$$

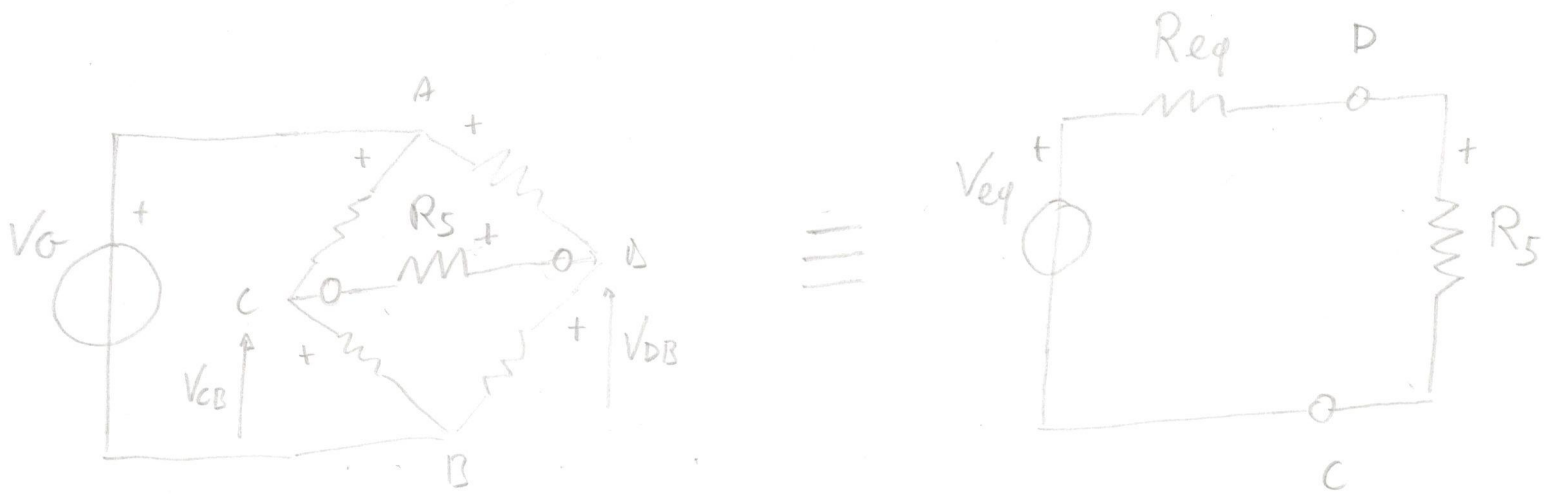
$$I_2 = 1,588 \text{ A}$$

$$I_3 = 2,471 \text{ A}$$

$$I_4 = 1,406 \text{ A}$$

$$I_5 = -0,118 \text{ A}$$

OCTAVE,
MATLAB,
SCILAB,
ETC.



Passo 1: RIMUOVO R_5 E CALCOLO V_{DC0}
 OPEN

REGOLA DEL PARTITORE:

$$V_{CB} = V_G \cdot \frac{R_3}{R_1 + R_3} = 10 \cdot \frac{3}{1+3} = 7,5 \text{ V}$$

$$V_{DB} = V_G \cdot \frac{R_4}{R_2 + R_4} = 10 \cdot \frac{4}{2+4} = 6,67 \text{ V}$$

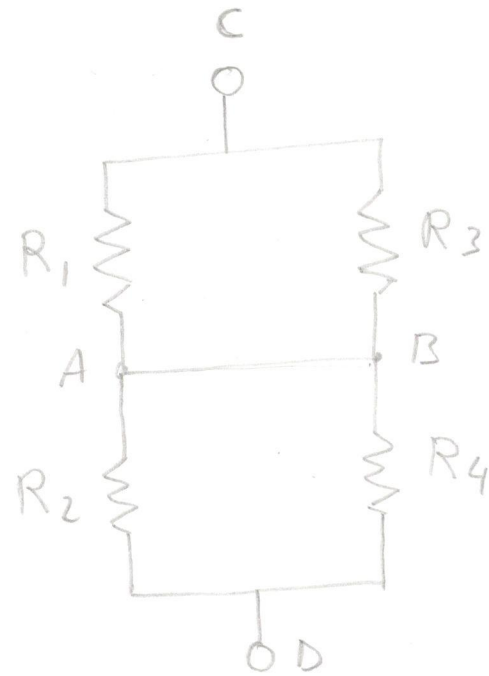
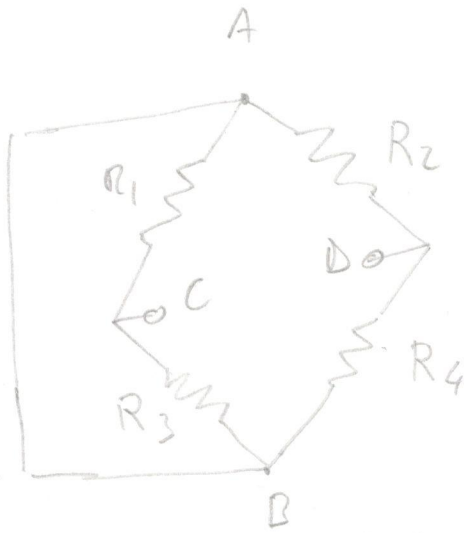
DUNQUE

$$V_{DC0} = V_{DB} - V_{CB} = 6,67 - 7,5 = -0,83 \text{ V}$$

THEVENIN AFFERMA CHE:

$$\underline{V_{eq}} = V_{DC0} = -0,83 \text{ V}$$

Passo 2: CORTOCIRCUITO IL GENERATORE
E CALCOLO LA RESISTENZA EQUIVALENTE
VISTA TRA I MORSETTI C E D

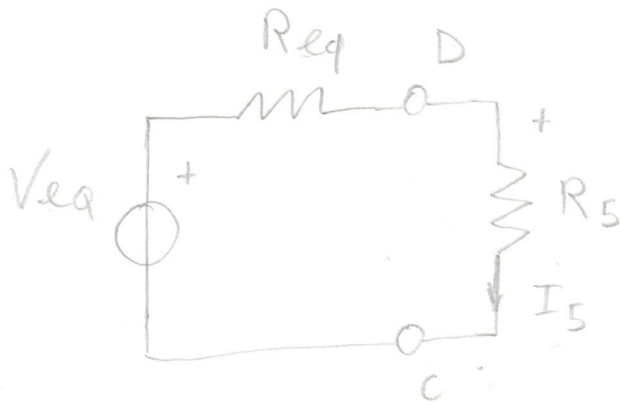


$$R_{eq} = R_1 // R_3 + R_2 // R_4 =$$

$$= \frac{R_1 R_3}{R_1 + R_3} + \frac{R_2 R_4}{R_2 + R_4} = \frac{1 \cdot 3}{1 + 3} + \frac{2 \cdot 4}{2 + 4} =$$

$$= 0,75 + 1,33 = 2,08 \Omega$$

Passo 3: CALCOLIAMO LA CORRENTE CHE
CIRCOLA IN R_5
E LA TENSIONE TRA I NODI C E D



$$V_{eq} = -0,83 \text{ V}$$

$$R_{eq} = 2,08 \Omega$$

$$I_5 = \frac{V_{eq}}{R_{eq} + R_5} = \frac{-0,83}{2,08 + 5} = -0,117 \text{ A}$$