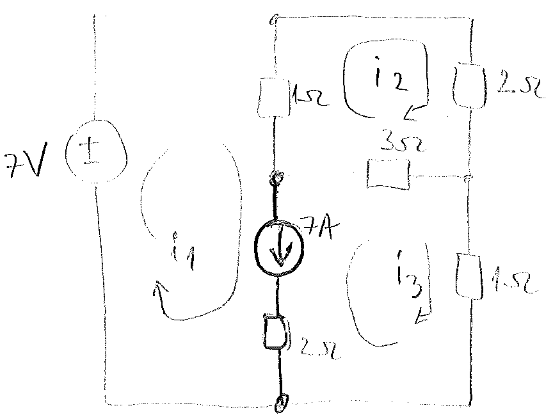
$\boxed{\text{The supermesh}}$ **Note**: Forgot last time: (7) lots of statistics in prodcenter!

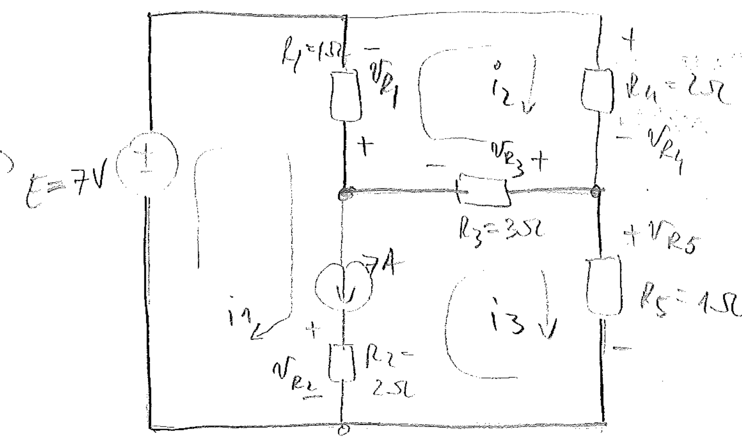
Similar to the "supernode" technique from nodal analysis.

- $\boxed{\text{Idea}}$ create a super-mesh from 2 meshes that have a current source in common; with the current source in the interior of the supermesh.

  - # of meshes is reduced by one.

Example:





loop i_1 + loop i_3 = supermesh.

Apply KLV for remaining loop(s) and supermesh:

loop (i_2): $v_{R_1} + v_{R_4} + v_{R_3} = 0 \longrightarrow R_1(i_2 - i_1) + R_4 \cdot i_2 + R_3(i_2 - i_3) = 0$

supermesh (i_1, i_3): $E + v_{R_1} + v_{R_3} = v_{R_5} \longrightarrow E + R_1(i_2 - i_1) + R_3(i_2 - i_3) = R_5 i_3$

$$\Rightarrow \begin{cases} i_2 - i_1 + 2i_2 + 3(i_2 - i_3) = 0 \\ i_2 - i_1 + 3(i_2 - i_3) - i_3 = -7 \end{cases} \Rightarrow \begin{cases} -i_1 + 6i_2 - 3i_3 = 0 \\ -i_1 + 4i_2 - 4i_3 = -7 \end{cases}$$

Add also: (for the independent source).

$7A = i_1 - i_3$

3 equations
3 unknowns.

$$\Rightarrow \begin{cases} i_1 - 6i_2 + 3i_3 = 0 \\ i_1 - 4i_2 + 4i_3 = 7 \\ i_1 \qquad - i_3 = 7 \end{cases} \quad A = \begin{bmatrix} 1 & -6 & 3 \\ 1 & -4 & 4 \\ 1 & 0 & -1 \end{bmatrix}, \; X = \begin{bmatrix} i_1 \\ i_2 \\ i_3 \end{bmatrix}, \; b = \begin{bmatrix} 0 \\ 7 \\ 7 \end{bmatrix}$$

$\Rightarrow \boxed{Ax = b} \longrightarrow$ solve it $\Rightarrow \boxed{i_1 = 9A}$ $\boxed{i_2 = 2.5A}$ $\boxed{i_3 = 2A}$

Therefore:

$$i_{R_1} = -i_1 = -9A$$

$$i_{R_2} = 7A$$

$$i_{R_3} = i_2 - i_3 = (2.5 - 2)A = 0.5A$$

$$i_{R_4} = i_2 = 2.5A$$

$$i_{R_5} = i_3 = 2A.$$