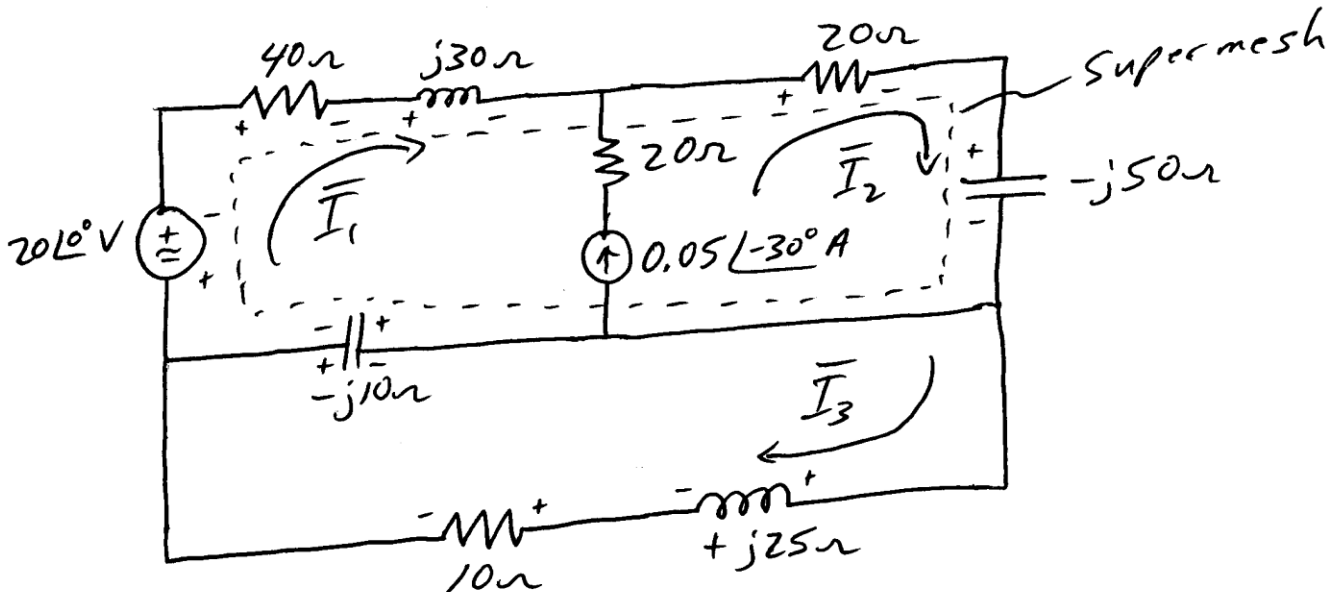


ex. Determine the currents shown in the circuit using mesh analysis



Mesh 1/2 Supermesh: $-20\angle 0^\circ + \bar{I}_1(40) + \bar{I}_1(j30) + \bar{I}_2(20) + \bar{I}_2(-j50) + (\bar{I}_1 - \bar{I}_3)(-j10) = 0$

Aux. Eqn: $\bar{I}_2 - \bar{I}_1 = 0.05\angle -30^\circ \text{ A}$

Mesh 3: $\bar{I}_3(j25) + \bar{I}_3(10) + (\bar{I}_3 - \bar{I}_1)(-j10) = 0$

↓ Put in standard form

$$(40 + j30 - j10)\bar{I}_1 + (20 - j50)\bar{I}_2 + (+j10)\bar{I}_3 = 20\angle 0^\circ$$

$$(-1)\bar{I}_1 + (1)\bar{I}_2 + (0)\bar{I}_3 = 0.05\angle -30^\circ$$

$$(+j10)\bar{I}_1 + (0)\bar{I}_2 + (j25 + 10 - j10)\bar{I}_3 = 0$$

↓ Solve using TI-68

$$\bar{I}_1 = 0.230543545 + j0.168768806 \text{ A} = \underline{\underline{0.2857\angle 36.206^\circ \text{ A}}}$$

$$\bar{I}_2 = 0.2738448 + j0.143768806 \text{ A} = \underline{\underline{0.30929\angle 27.6995^\circ \text{ A}}}$$

$$\bar{I}_3 = -0.05447585 - j0.148829777 \text{ A} = \underline{\underline{0.15849\angle -110.104^\circ \text{ A}}}$$