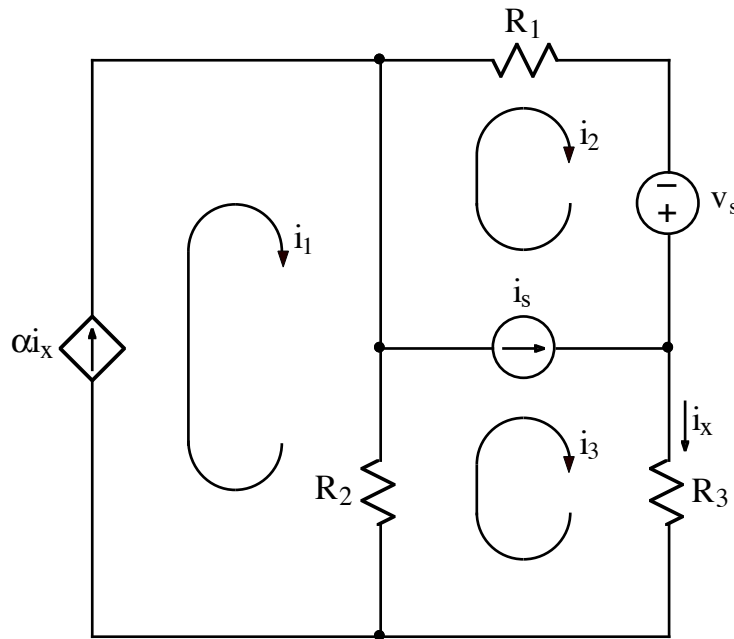


Ex:



For the circuit shown, write three independent equations for the three mesh currents, i_1 , i_2 , and i_3 . The quantity i_x must not appear in the equations.

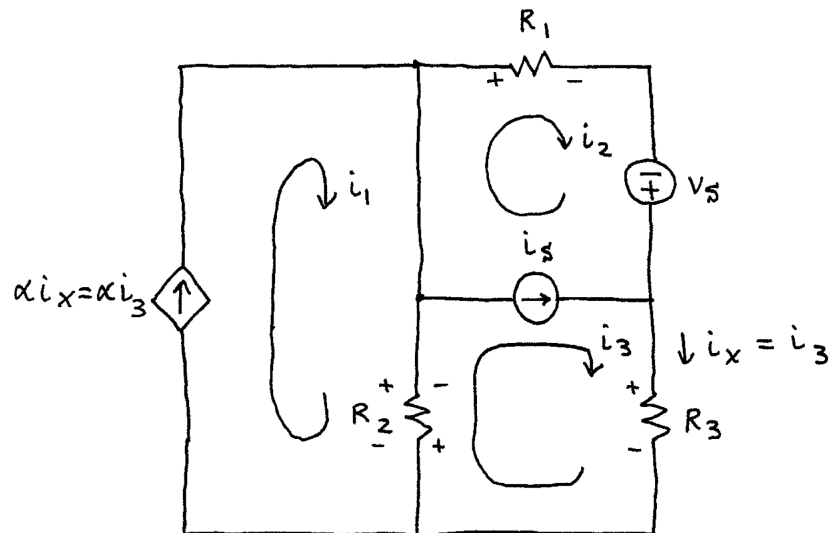
sol'n: We first write i_x in terms of mesh currents.

Since i_x is a current on the outside edge of the circuit, (flowing thru R_3), it is equal to the mesh (also called "loop") current.

$$i_x = i_3$$

Next we look for super meshes where a current src is between two loops. We have a supermesh for i_2, i_3 with i_s in between.

We draw the circuit model before writing our eq'n's.



$$i_2, i_3 \text{ loop: } -i_3 R_2 + i_1 R_2 - i_2 R_1 - i_3 R_3 = 0V$$

(supermesh
uses loop
around right
half of circuit)

We add a current eq'n for i_s src between loops.

$$i_s = i_3 - i_2 \quad (i_2 \text{ has } - \text{ sign because it is measured in direction opposite to direction of } i_s)$$

Finally, for the i_1 loop we encounter a curious situation. Since we have a current source on the outside edge of the circuit, we must have that $i_1 =$ current for src.

Thus, $i_1 = \alpha i_3$. This is the eq'n for i_1 .

We now have 3 eq'ns in i_1, i_2, i_3 which we could solve to find $i_1, i_2,$ and i_3 .