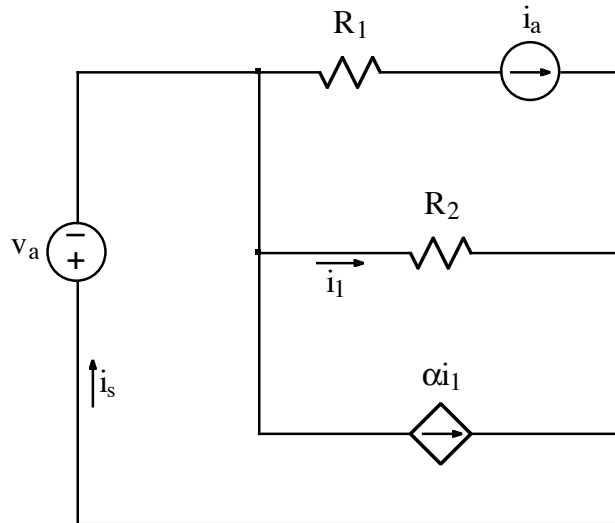


Ex:



The expression for current i_s is the following:

$$i_s = i_a - (\alpha + 1) \frac{v_a}{R_2}.$$

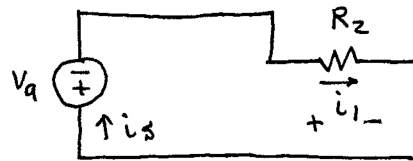
Make at least one consistency check (other than a units check) on this expression. Explain the consistency check clearly.

SOL'N:

Many consistency checks are possible. The idea is to pick component values that make the circuit so simple that we can solve it by inspection.

One example is to eliminate current sources:

$$\text{Let } i_a = 0A \text{ and } \alpha = 0:$$



We have $i_s = i_1 = -\frac{V_a}{R_2}$.

Now we verify that our eq'n from (a) agrees:

$$i_s = 0 - (0+1) \frac{V_a}{R_2} = -\frac{V_a}{R_2} \checkmark$$

Another example is to set $V_a = 0V$, $\alpha = 0$.

Then $i_s = i_1$. Our eq'n gives $i_s = i_1 - (0+1) \cdot \frac{0}{R_2} = i_1 \checkmark$