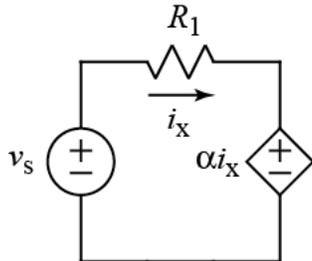


Ex:



Find the equivalent resistance of the dependent source in the above circuit.

SOL'N: A dependent source may be converted to a resistance when we can express both the voltage across it and the current through it as the dependent variable, here i_x , times values, say k_1 and k_2 . Then we can use Ohm's law to find the value of the equivalent resistance, R_{eq} .

$$R_{eq} = \frac{v}{i} = \frac{k_1 i_x}{k_2 i_x} = \frac{k_1}{k_2}$$

Here, we have that the voltage for the dependent source is αi_x , so our goal is to express the current through the voltage source as a constant times i_x . It is simple in the present case, since the current in the dependent source is i_x .

$$R_{eq} = \frac{v}{i} = \frac{\alpha i_x}{i_x} = \alpha$$