

EXPERIMENT-3

RECIPROCITY THEOREM

PROBLEM STATEMENT: To study and verify the reciprocity theorem

THEORY:

This experiment is focused on observing the reciprocal behavior of the network. In Reciprocal network power losses are the same between any two ports regardless of direction of propagation. The principle of reciprocity implies that the input and output can be interchanged without altering the response of the network to a prescribed input.

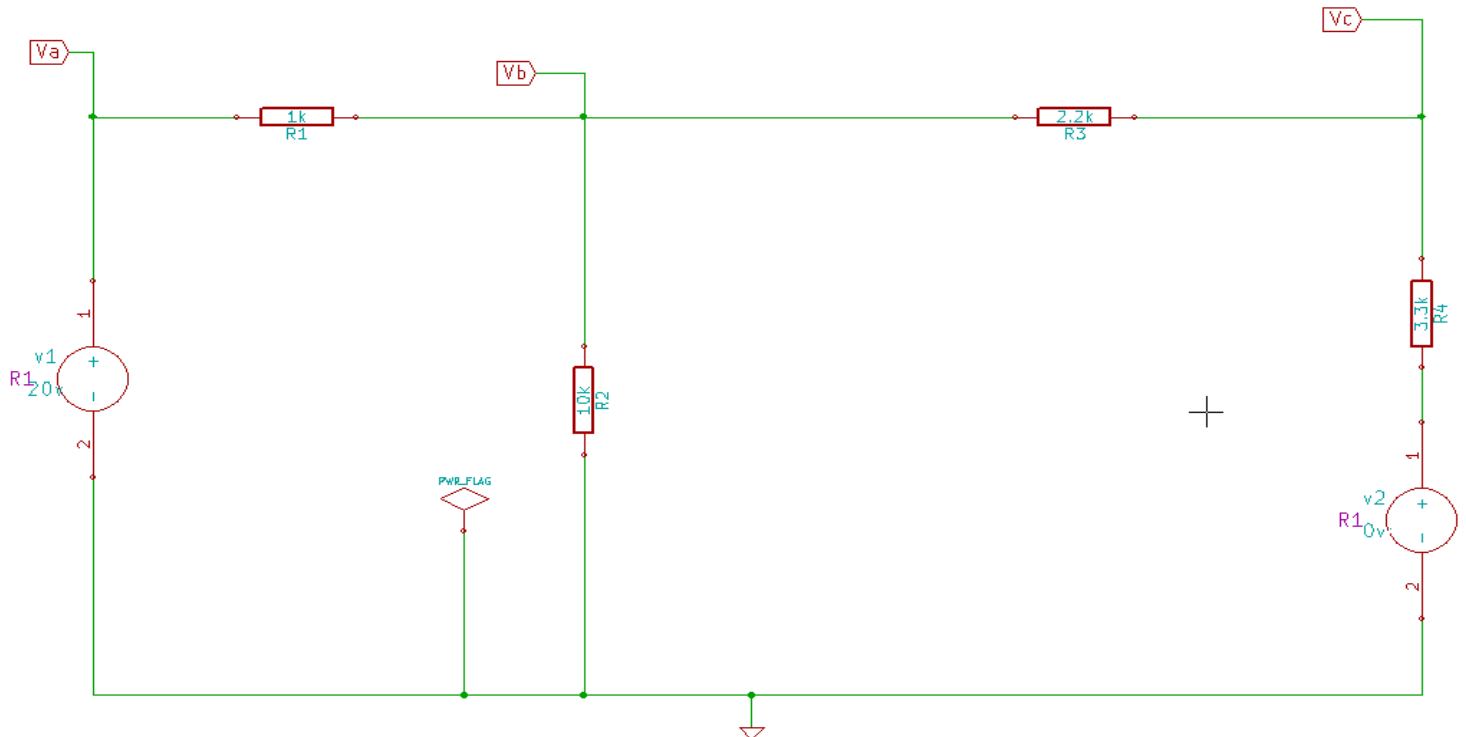
The Reciprocity theorem states that in a linear, bilinear, single source network. The ratio of excitation to response is constant when the positions of excitation and response are interchanged.

This theorem is applicable only when the circuit has one source. It is not applicable to the circuits having dependent source.

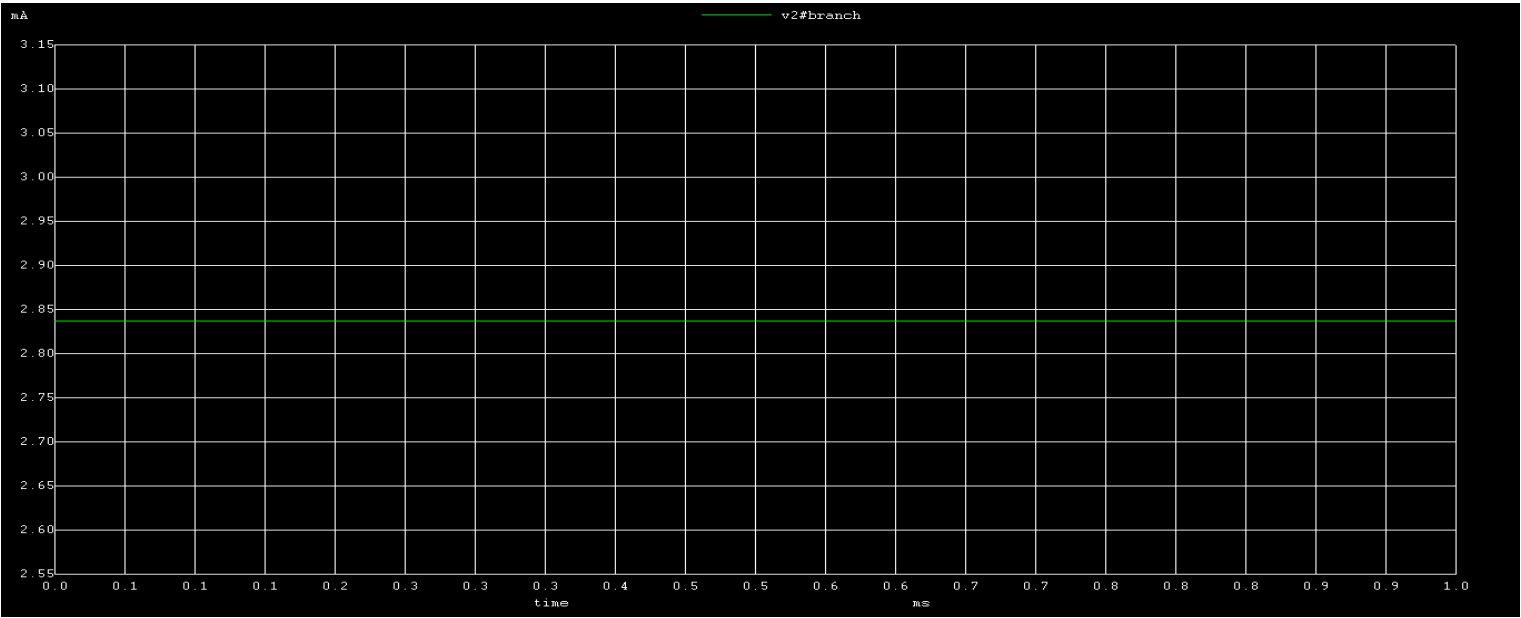
SCHEMATIC DIAGRAM:

$V_1 = 20\text{volts}$

Refer to "reciprocity" FOLDER



SIMULATION OUTPUT:



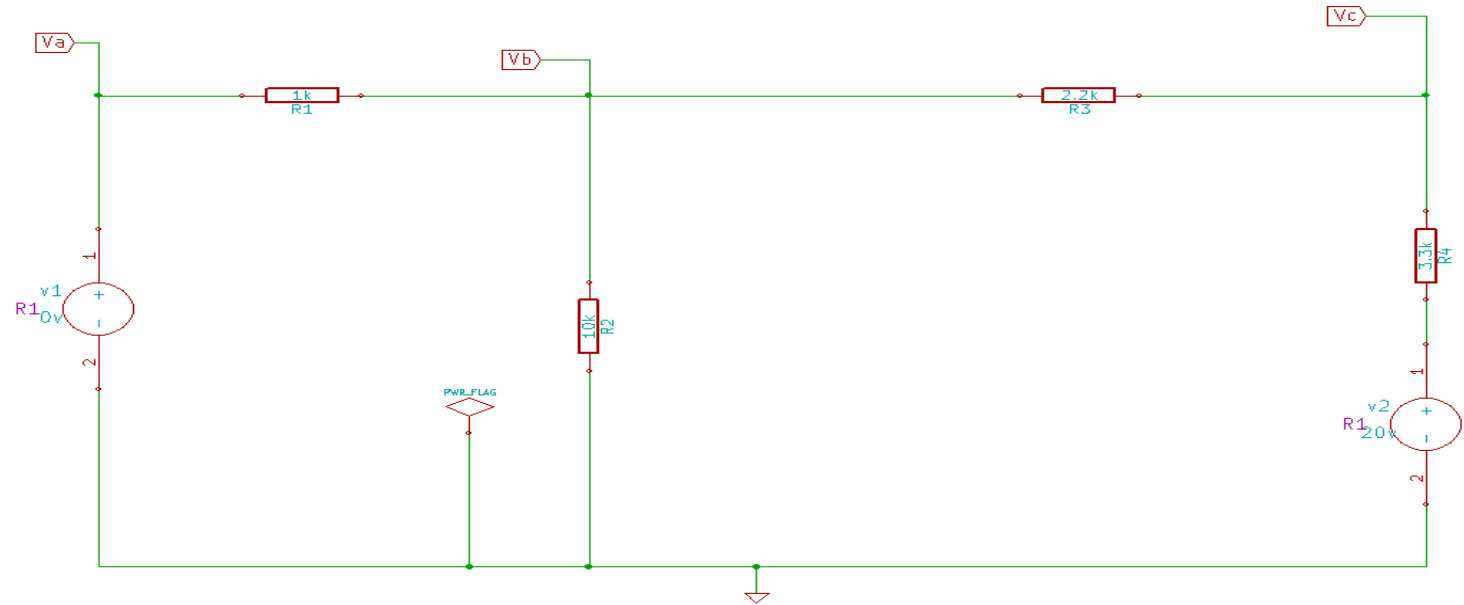
Waveform of Current through the Resistor R₄

The Current through resistor R₄ is shown in the waveform=2.83 mA.

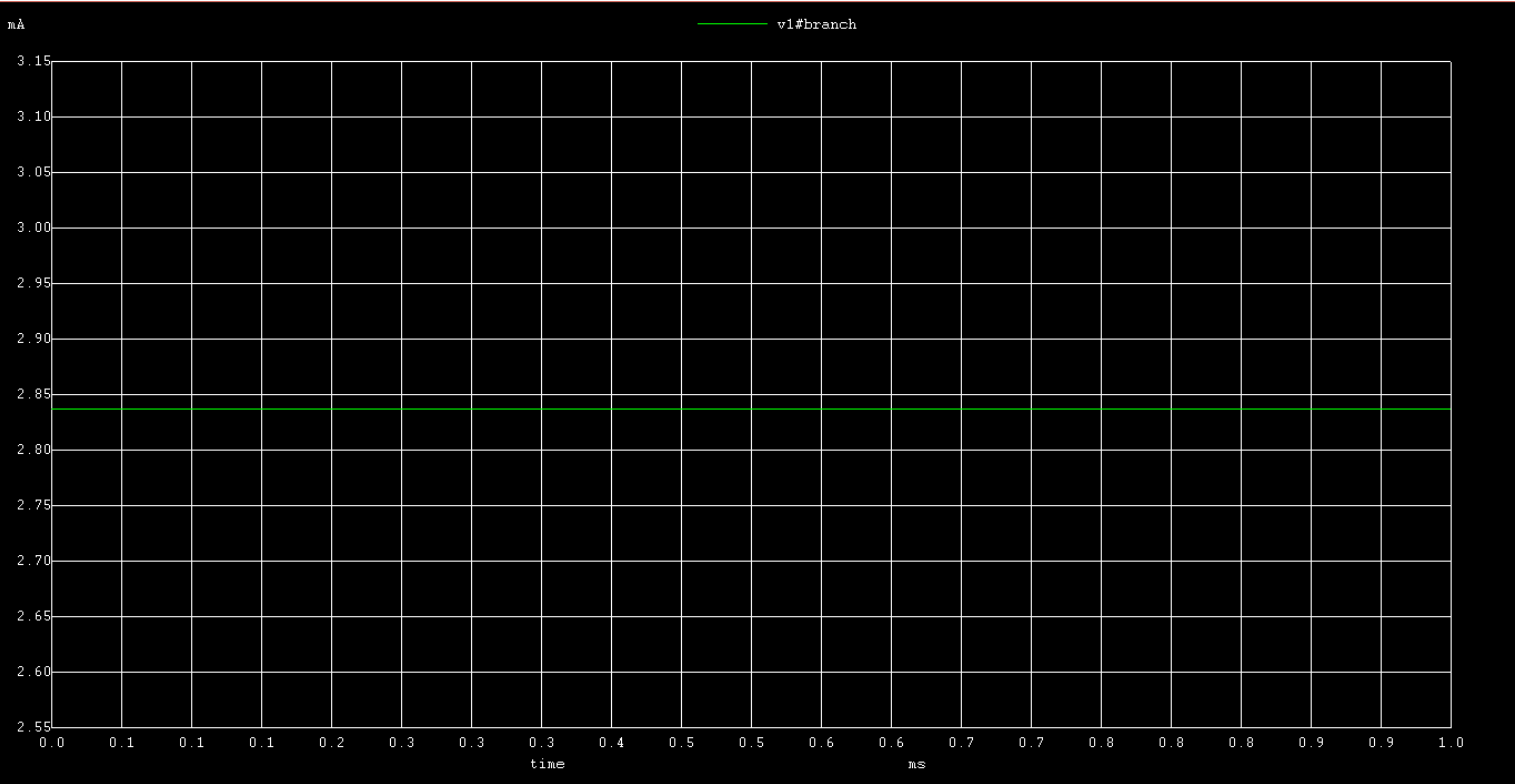
Now the position of the excitation and response are interchanged. V₂=20volts.

SCHEMATIC DIAGRAM:

V₂=20volts Refer to "reciprocity1" FOLDER



SIMULATION OUTPUT:



Waveform of Current through the Resistor R₁

The Current through resistor R₁ is shown in the waveform=2.83 mA.

CONCLUSION: