

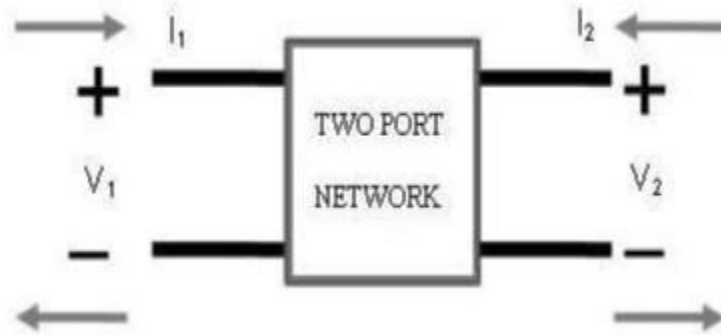
# EXPERIMENT-5

---

## ADMITTANCE (Y)-PARAMETER

**PROBLEM STATEMENT:** To study the y-parameter

**THEORY:**



If we choose  $I_1$  and  $I_2$  as dependent variables,  $V_1$  and  $V_2$  as independent variables. Then the network can be characterized by following sets of equations.

$$I_1 = Y_{11} * V_1 + Y_{12} * V_2$$

$$I_2 = Y_{21} * V_1 + Y_{22} * V_2$$

Observe that if either  $V_1=0$  or  $V_2=0$  the four parameters may be defined in terms of ratio of a current and voltage.

$$Y_{11} = I_1 / V_1 \text{ when } V_2 = 0$$

$$Y_{12} = I_1 / V_2 \text{ when } V_1 = 0$$

$$Y_{21} = I_2 / V_1 \text{ when } V_2 = 0$$

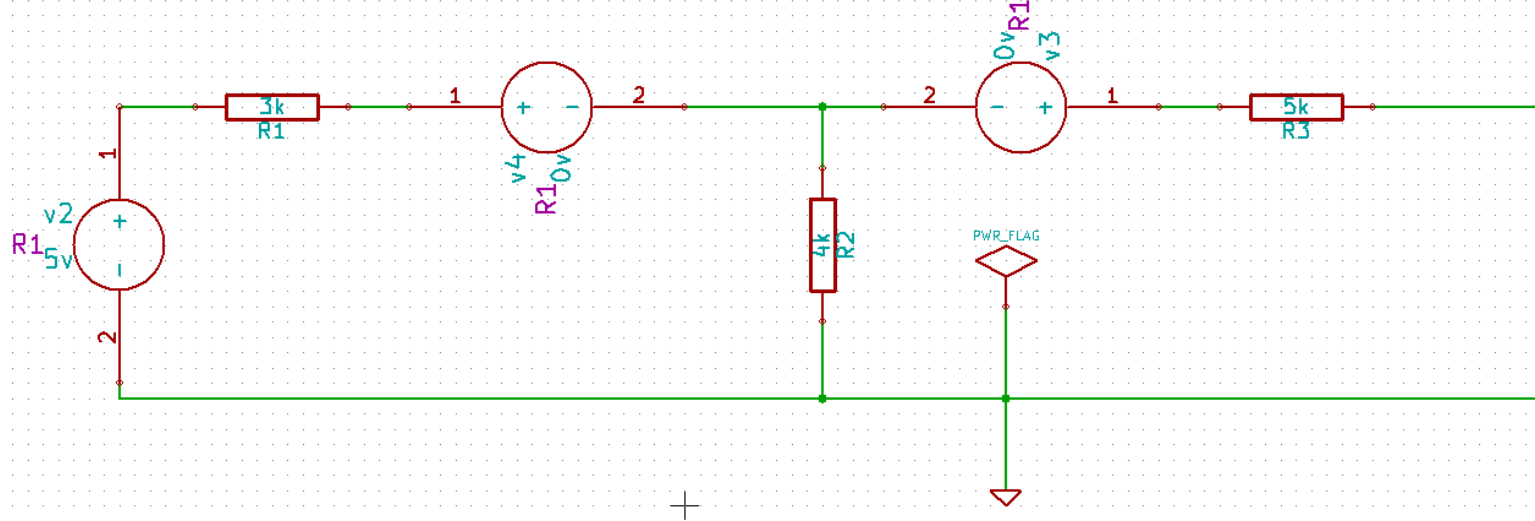
$$Y_{22} = I_2 / V_2 \text{ when } V_1 = 0$$

The short circuit admittance or Y- parameters are useful in characterizing parallel –parallel connected two port networks. The Y-parameters of two two-port networks connected in parallel- parallel connection is the algebraic sum of the short circuit admittance matrices of individual two port networks.

**SCHEMATIC DIAGRAM:**

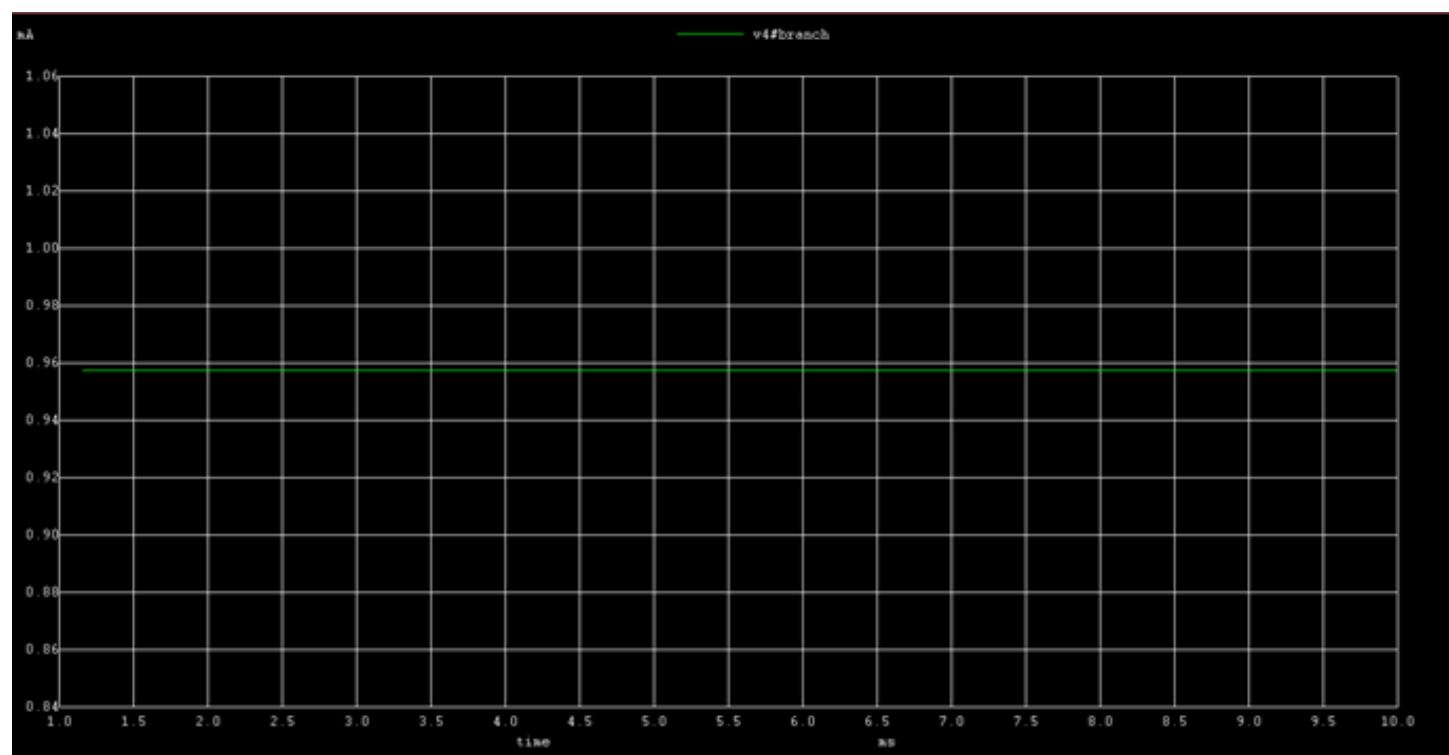
**FOR  $V_1=0$**

Refer to "ypara" FOLDER

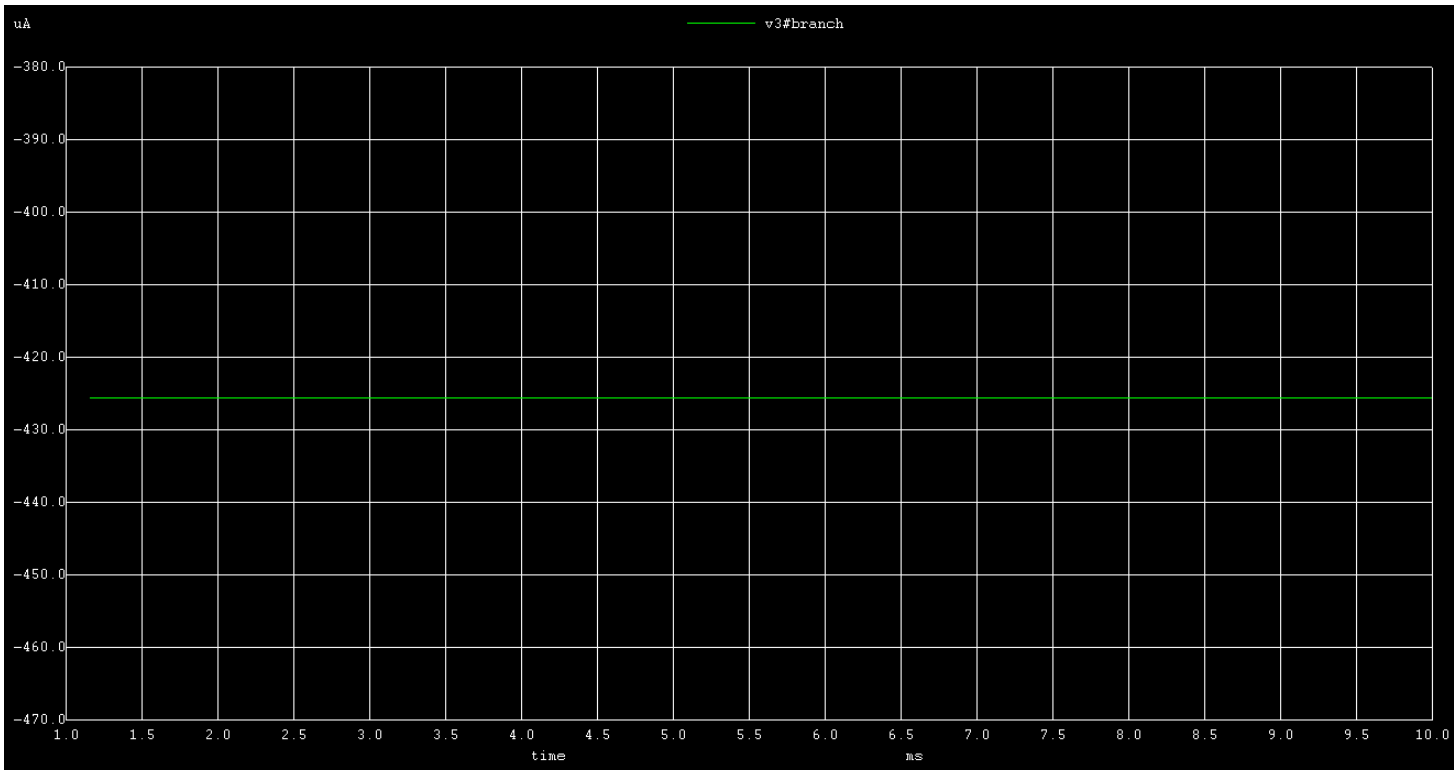


## SIMULATION OUTPUT:

### Value Of $I_2$

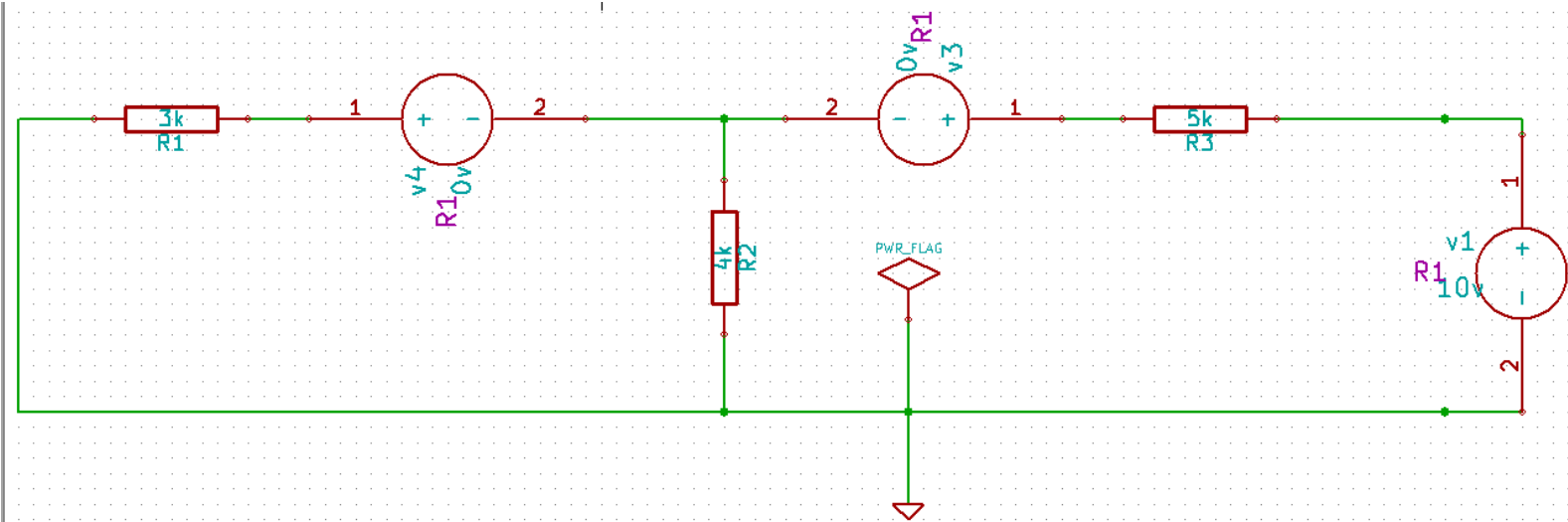


Value of I<sub>1</sub>



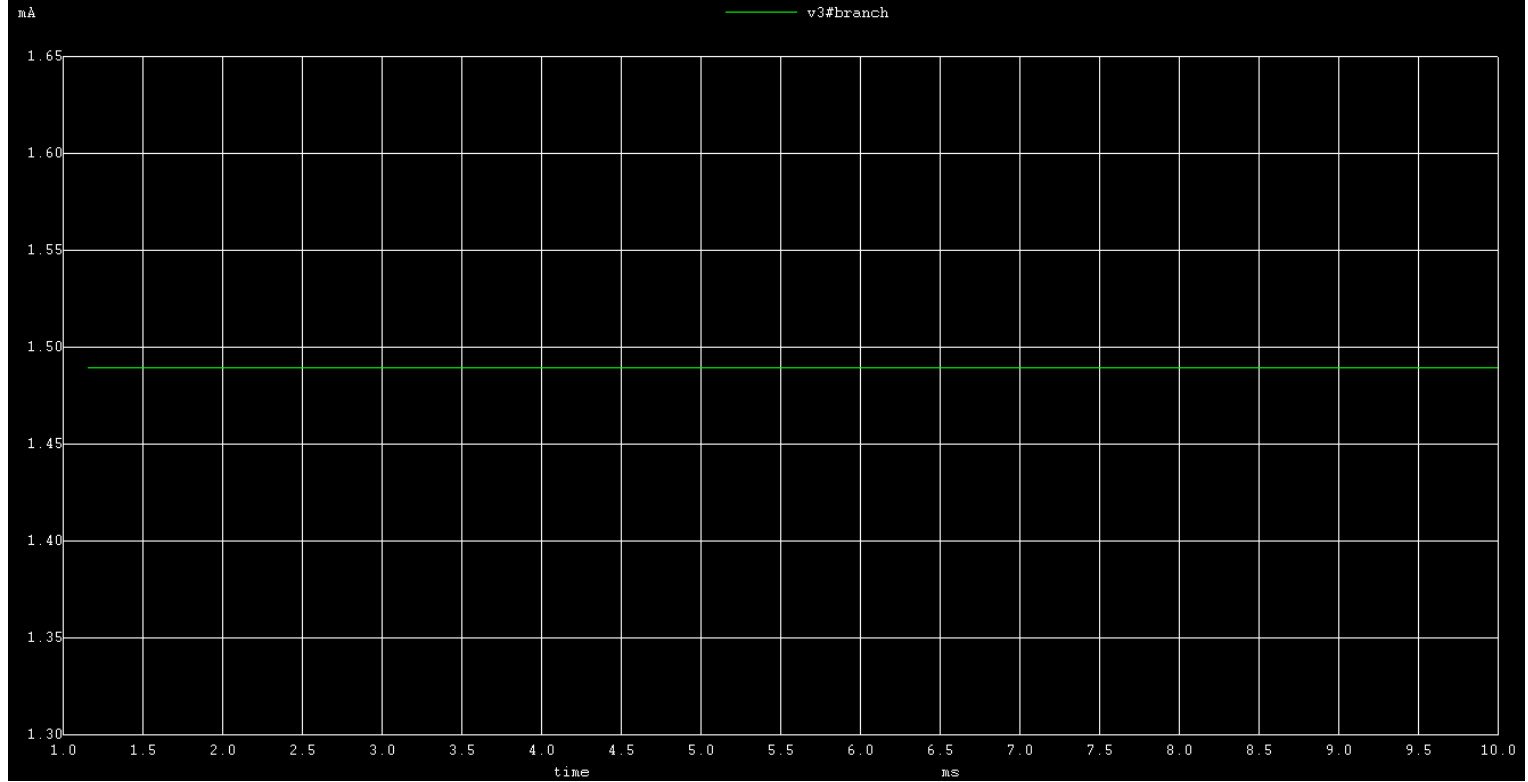
SCHEMETIC DIAGRAM:

FOR V2=0 Refer to "ypara1" FOLDER

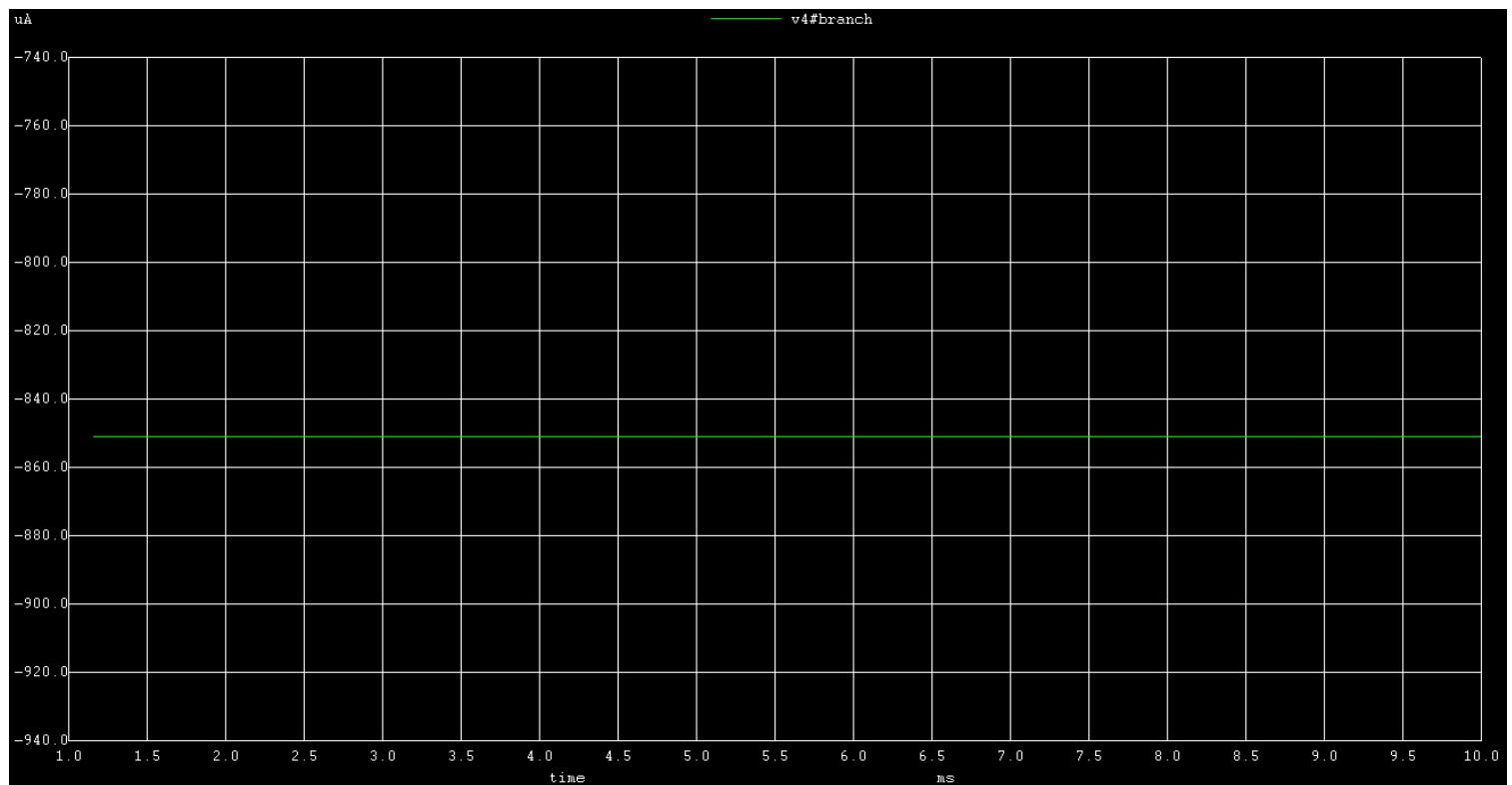


SIMULATION OUTPUT:

Value of I<sub>1</sub>



## Value of $I_2$



## CALCULATIONS:

$$Y_{11} = I_1/V_1 \text{ when } V_2 = 0 \text{ volts}$$

$$I_1 = 1.456 \text{ mA}, V_1 = 5 \text{ volts}$$

$$Y_{11} = 1.456/5 = 0.291 (\text{k}\Omega)^{-1}$$

$Y_{12} = I_1/V_2$  when  $V_1 = 0$ volts

$I_1 = -425\mu A$ ,  $V_2=5$ volts

$Y_{12} = -0.425/5 = -0.085(k\Omega)^{-1}$

$Y_{21} = I_2/V_1$  when  $V_2 = 0$ volts

$I_2 = -850\mu A$ ,  $V_1=5$ volts

$Y_{21} = -0.850/5 = -0.17(k\Omega)^{-1}$

$Y_{22} = I_2/V_2$  when  $V_1 = 0$ volts

$I_2 = 0.956mA$ ,  $V_2=5$ volts

$Y_{22} = 0.956/5 = 0.1912(k\Omega)^{-1}$

$Y_{11} (k\Omega^{-1})$	$Y_{12} (k\Omega^{-1})$	$Y_{21} (k\Omega^{-1})$	$Y_{22} (k\Omega^{-1})$
0.291	-0.085	-0.17	0.1912

**CONCLUSION:**