Circuit Theory and Electronics Fundamentals

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Example Laboratory Report

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Contents

1 Introduction

The testeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee objective of this laboratory assignment is to study a circuit containing a sinusoidal voltage source V_I connected to a resistor R and a capacitor C

2 Theoretical Analysis

In this section, the circuit shown in Figure **??** is analysed theoretically, in terms of its time and frequency responses.

3 Valores octave

Name	Value [A or V]
V1	-1.887311
V2	-5.704042
V3	6.994799
V4	-1.878469
V5	-2.977654
V6	-5.113245
V7	-1.887056

Table 1: Operating point. A variable preceded by @ is of type *current* and expressed in Ampere; other variables are of type *voltage* and expressed in Volt.

Name	Value [A or V]
Ia	-0.001857
Ib	-0.001857
Ic	-0.001058
Id	0.001004

Table 2: Operating point. A variable preceded by @ is of type *current* and expressed in Ampere; other variables are of type *voltage* and expressed in Volt.

Name	Value [A or V]
Ir3	0.000000
Ir4	-0.000799
Ir5	0.002861
Ivc	0.002062

Table 3: Operating point. A variable preceded by @ is of type *current* and expressed in Ampere; other variables are of type *voltage* and expressed in Volt.

4 Simulation Analysis

4.1 Operating Point Analysis

Table 4 shows the simulated operating point results for the circuit under analysis. Compared to the theoretical analysis results, one notices the following differences: describe and explain the differences.

Name	Value [A or V]
@gb[i]	-1.85722e-03
@id[current]	1.003968e-03
@r1[i]	-1.85714e-03
@r2[i]	1.857222e-03
@r3[i]	-8.11657e-08
@r4[i]	7.994898e-04
@r5[i]	-2.86119e-03
@r6[i]	-1.05765e-03
@r7[i]	-1.05765e-03
v(1)	-1.88731e+00
v(2)	-5.70404e+00
v(3)	6.994799e+00
v(4)	-1.87847e+00
v(5)	-2.97765e+00
v(6)	-5.11325e+00
v(7)	-1.88706e+00
v(8)	-5.11325e+00

Table 4: Operating point. A variable preceded by @ is of type *current* and expressed in Ampere; other variables are of type *voltage* and expressed in Volt.

5 Conclusion

In this laboratory assignment the objective of analysing an RC circuit has been achieved. Static, time and frequency analyses have been performed both theoretically using the Octave maths tool and by circuit simulation using the Ngspice tool. The simulation results matched the theoretical results precisely. The reason for this perfect match is the fact that this is a straightforward circuit containing only linear components, so the theoretical and simulation models cannot differ. For more complex components, the theoretical and simulation models could differ but this is not the case in this work.