T4 - Audio Amplifier

Integrated Master in Physics Engineering

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1 Introduction

In this laboratory assignment we seek to build an audio amplifier circuit , with the goal of maximizing the merit figure, M, given by:

$$M = \frac{voltageGain * bandwidth}{cost * lowerCutoffFreq}$$

being that the voltage gain is given by the quotient between the output voltage and the input voltage; the bandwidth is the magnitude of the interval of frequencies for which the circuit functions; and the lower cut off frequency is given by the lowest frequency for which the circuit functions. The cost equals the sum of the cost of each individual component.

The circuit consists only of resistors, voltage sources (AC as well as DC), capacitors and bipolar junction transistors (more specifically one PNP transistor and one NPN transistor)

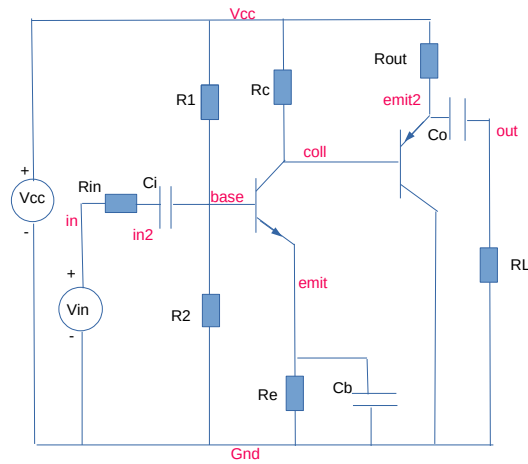The circuit used was the following:

Figure 1: Circuito utilizado

In Section 2, a theoretical analysis is presented. In Section 3, the circuit is analysed by simulation, and the results are compared to the theoretical results obtained in Section 2. The conclusions of this study are outlined in Section 4.

2 Theoretical Analysis

VT	0.025000
BFN	178.700000
VAFN	69.700000
RE1	0.000000
RC1	1000.000000
RB1	80000.000000
RB2	20000.000000
VBEON	0.700000
VCC	12.000000
RS	100.000000

Table 1: Values used as parameters for the circuit studied.
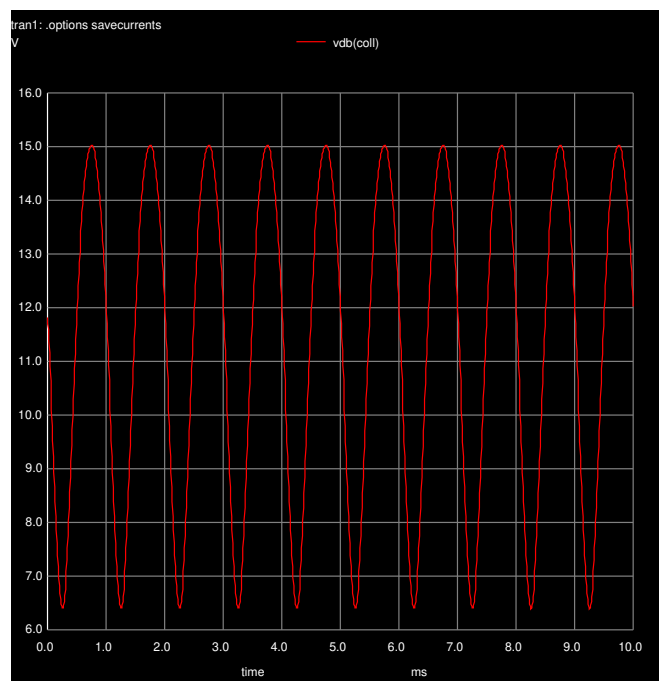
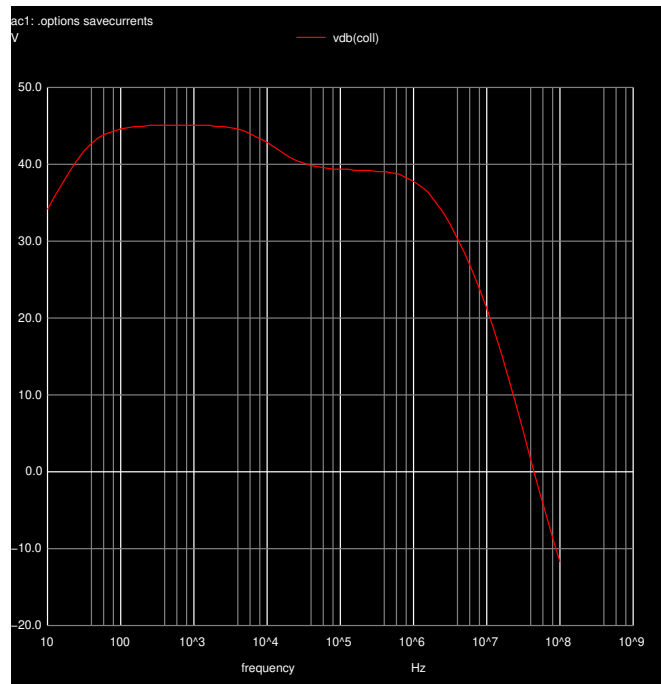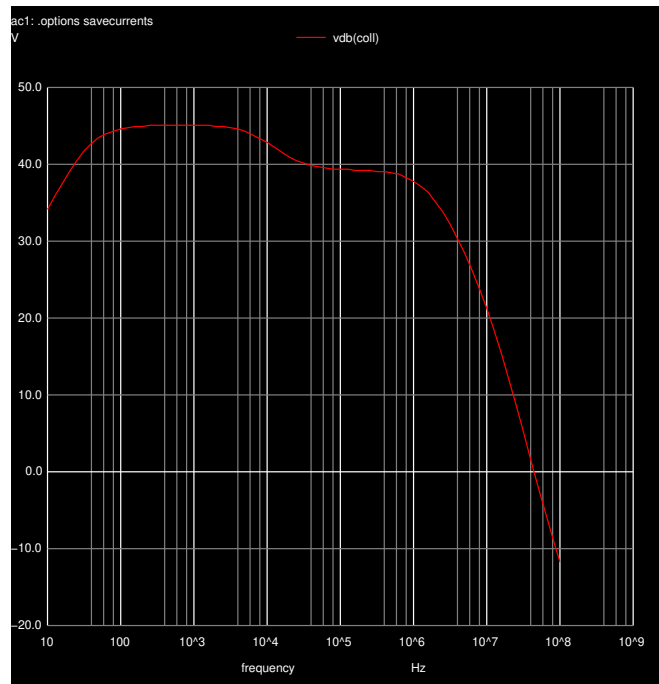# 3 Simulation Analysis

Figure 2: ———

Figure 3: ————

Figure 4: ─────────

4   Conclusion

In this laboratory assignment the objective of analysing a simple circuit has been achieved.