TÉCNICO LISBOA

Laboratory Report 4: Audio Amplifier

Circuit Theory and Electronics Fundamentals

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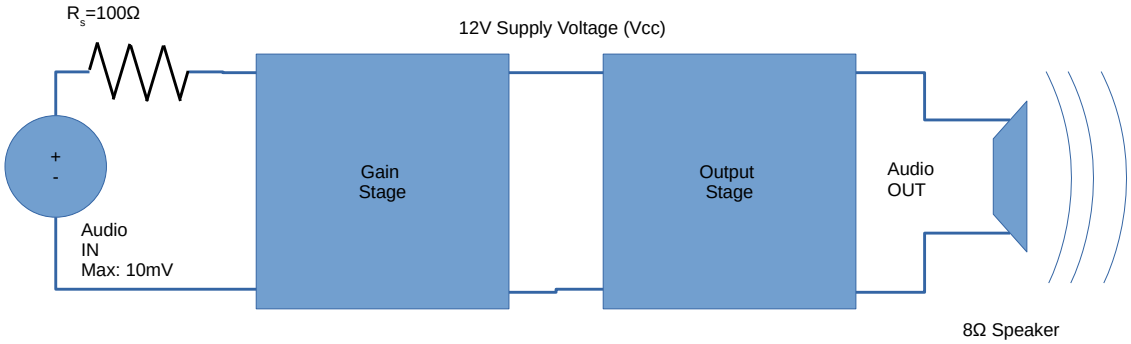
Contents

1 Introduction

The objective of this laboratory assignment is to design an audio amplifier circuit, by choosing the architecture of the Gain and Output amplifier stages.The referred circuit is shown in the picture below.

Figure 1: Audio Amplifier Circuit



As mentioned above, it is also important to refer that we have developed an optimization algorithm (in Octave) in order to find the number of transistors, the values of the resistors and capacitor that would lead to the best value of merit, computed in Ngspice with the formula given by the Professor.

2 Theoretical Analysis

In this section we will discuss the theoretical analysis of our circuit. For this purpose, we will first explain seperately the Gain stage and the output stage circuits on the Audio Amplifier circuit. The values used throughout this analysis are shown below.

V_{ON} value is computed using *Ngspice* results for V_{out}. By definition, $V_{ON} = \frac{V_{out}}{N_{diodes}}$

Symbol	Value
R_S	100Ω
A_f	$12V$
$AudioINMax$	$10mV$
$Speaker$	8Ω

Table 1: Values for theoretical analysis

2.1 Gain Stage

Figure 2: Gain Stage Circuit.

As seen in figure 2...

2.2 Output Stage

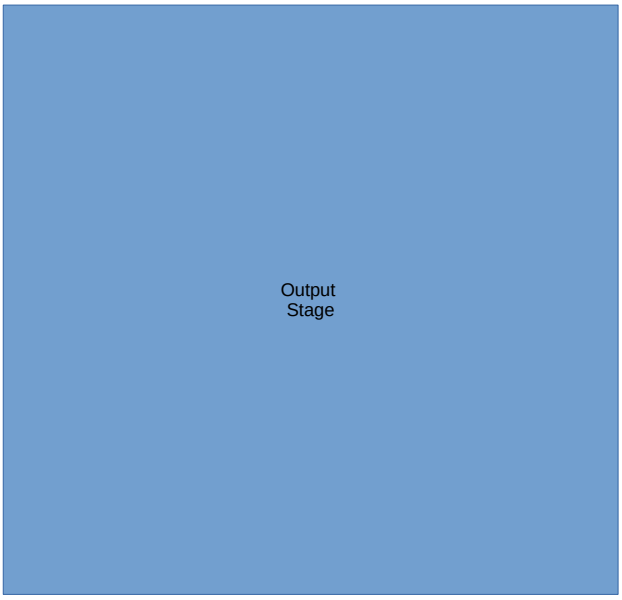


Figure 3: Output Stage Circuit.

3 Simulation Analysis

In this section, we will the obtained results by simulating the referred circuit in Ngspice.

4 Conclusion