TÉCNICO LISBOA

Circuits Theory and Electronic Fundamentals

Integrated Master in Engineering Physics, IST, University of Lisbon

Lab 5: Bandpass filter using OPAMP

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1 Introduction

The main objective of this laboratory assignment is to

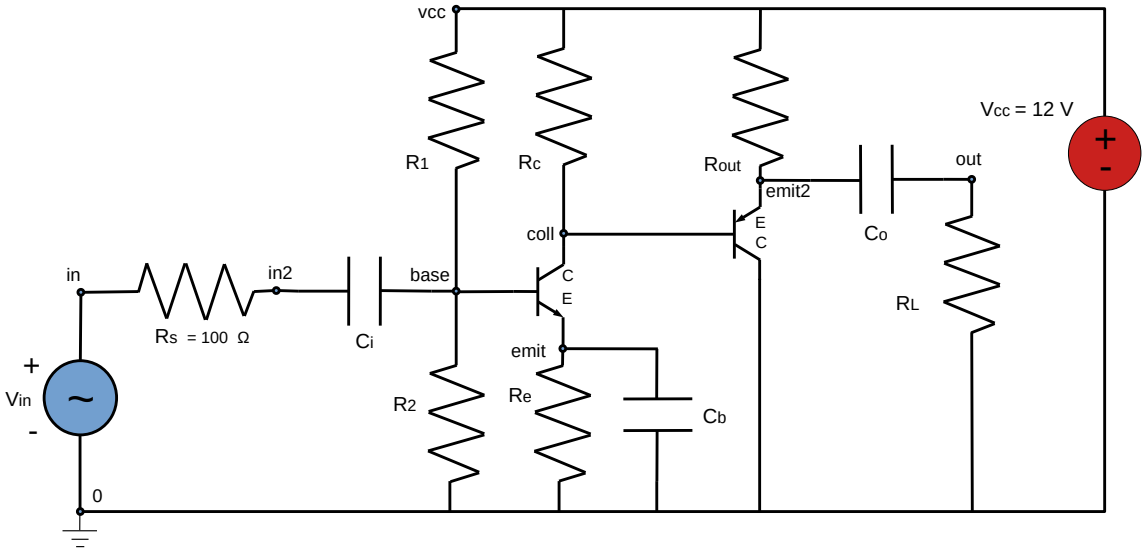

Figure 1: Circuit to be analysed in this laboratory assignment.

2 Theoretical Analysis

The values used for the circuit's

3 Simulation Analysis

In order to simulate this circuit with Ngspice,

4 Conclusion

In this laboratory assignment, the intended objective has been achieved. The AC/DC converter has been simulated accordingly by using Ngspice and a rather precise output voltage as close to 12V as possible has been obtained. Moreover, a suitable theoretical model was utilized in order to predict the output of the simulated circuit, having obtained a voltage quite close to the one obtained in Ngspice. However, the value obtained in this analysis was slightly further away from the desired 12V DC output voltage. The differences between the results obtained in both analysis may be due to several factors. The theoretical diode model considered is different from the much more complex diode model used by Ngspice. Moreover, the theoretical analysis is subjected to certain approximations and a nonlinear equation must be solved.

A ripple of approximately 10^{-4}V was obtained for both cases. A smaller value could have been obtained by using bigger values for R_1 and C, for example. However, that would also lead to a larger monetary cost. By taking into account the different aspects at hand, rather precise results and an acceptable merit M have been obtained.