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| MSS Lab Part A: Lumped Element Simulation (Saber) Exercise 6: Frequency Analysis and Sensitivity Analysis | | Prof. Dr.-Ing. G.Schmitz Flugzeug- Elektrik und Elektronik |
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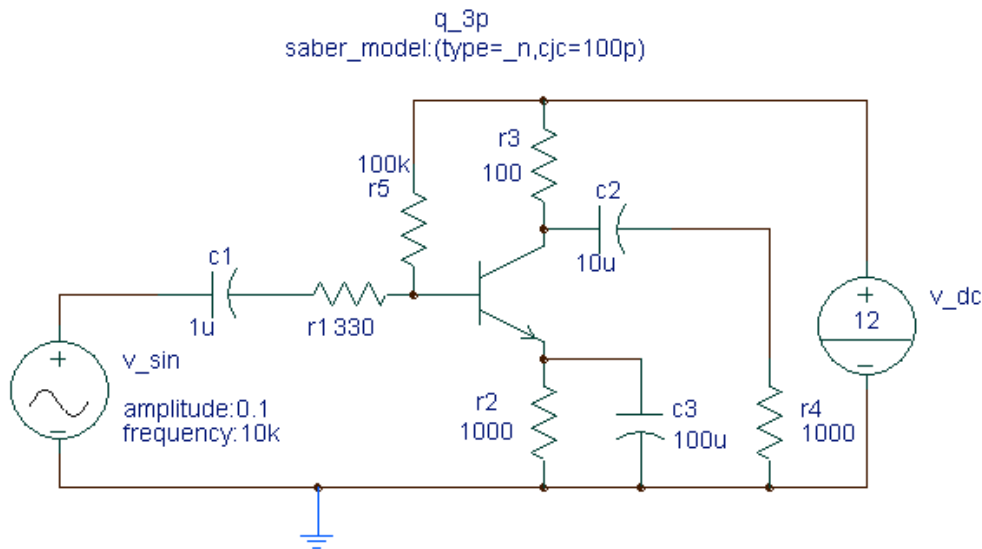
1 Introduction

In this lab we want to learn more about frequency analysis and learn to use sensitivity analysis.

2 Execution of the exercises

In the exercise you will be shown the frequency analysis of a transistor amplifier stage.

The circuit:

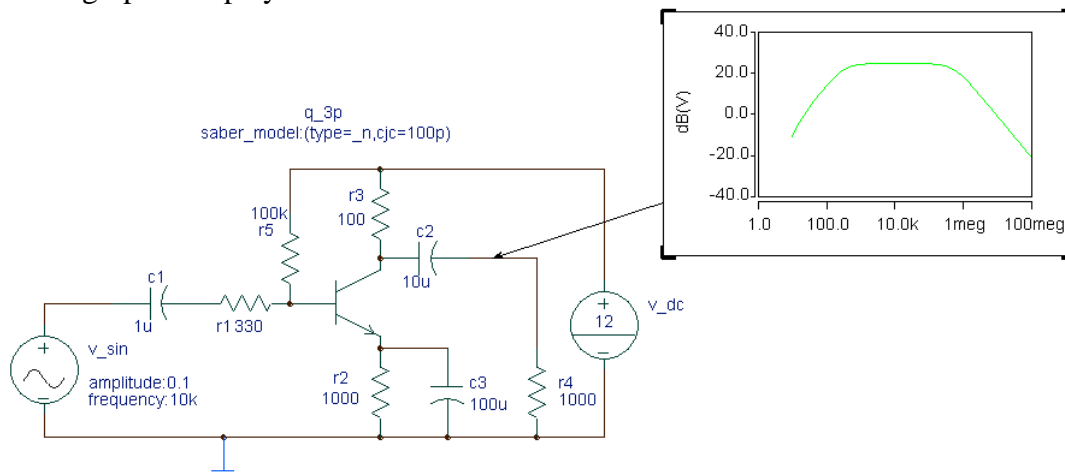


As transistor we use a generic model for an npn Bipolar Junction Transistor (BJT) named q_3p. We have to enter as a parameter of the transistor a certain capacitance from collector to the base to realistically simulate the high frequency behavior of the transistor.

2.1 Frequency Simulation

2.1.1 Simulation of the frequency response of the unmodified design

Use the frequency simulation tool to get the frequency response from 10Hz to 10MHz. You should use a graphic display in the circuit:



2.1.2 Simulation with modified component values

Try out different values for the components and find out, how the amplification and the frequency response is affected.

2.2 Sensitivity Analysis

Invoke the sensitivity analysis form and first add the frequency analysis. Then you can add different measurements (“Batch measure”) to investigate different sensitivities:

- maximum to find out the influence on the amplification
- at x – begin to find out the influence to low frequencies
- at x – end to find out the influence to high frequencies

Then select the parameters (“Browse design”)

Which components show the strongest influence?