EEC 233-Electronic II

Feedback Amplifier (Lab 3)

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Electrical Engineering Department

Communication and Electronics

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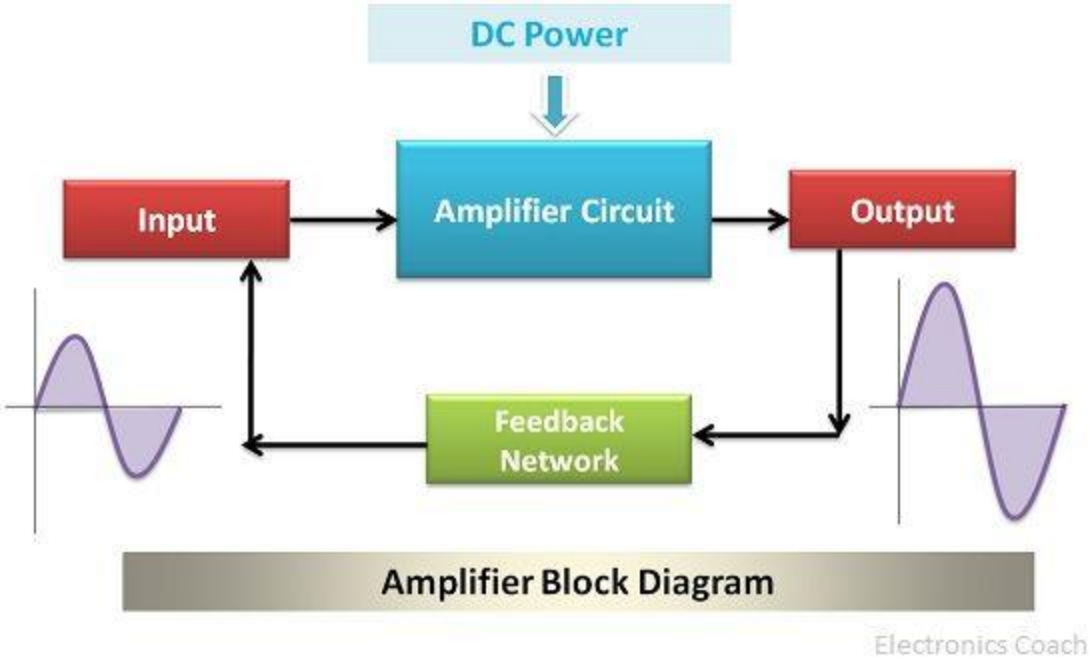
Introduction

This report aims to study the effect of feedback on the frequency response of a Common Emitter Amplifier using Multisim. Multisim is a software tool for simulating electronic circuits and analyzing their performance characteristics. The report will provide an overview of feedback in electronic circuits, describe the Common Emitter Amplifier circuit and its frequency response characteristics, outline the simulation setup and procedures using Multisim, present and analyze the simulation results, and conclude with a discussion of the implications of the findings.

The concept of FB Amplifier circuit:

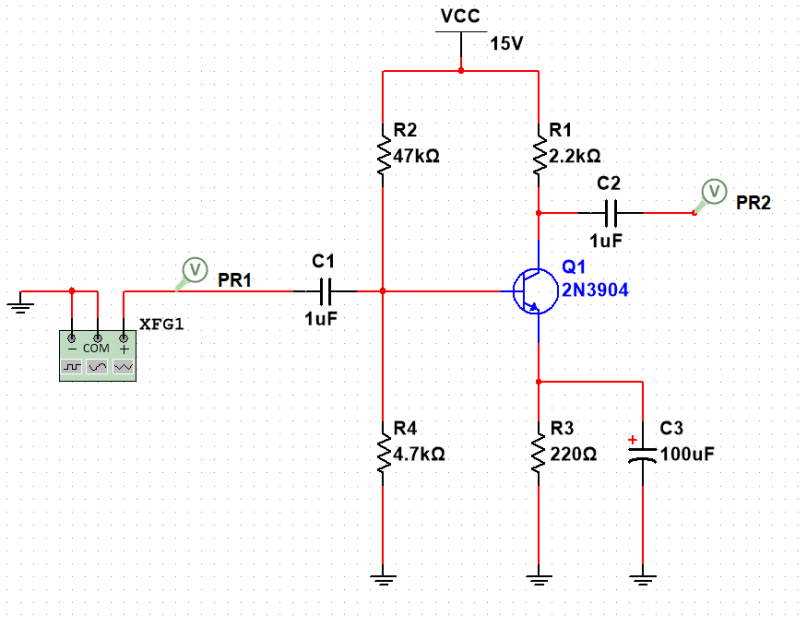


feedback circuits can have a significant impact on the frequency response and gain of an amplifier. The feedback reduces distortion, noise, and other unwanted characteristics in the output signal, making the amplifier more stable and predictable. The gain of the amplifier can also be reduced in the frequency range where the feedback is applied, and the amount of gain reduction depends on the type of feedback circuit used and the frequency response characteristics of the amplifier. The feedback can improve the bandwidth of the amplifier by reducing the effect of parasitic capacitances and inductances in the circuit, but it can also reduce the resonance frequency of the amplifier due to the additional phase shift

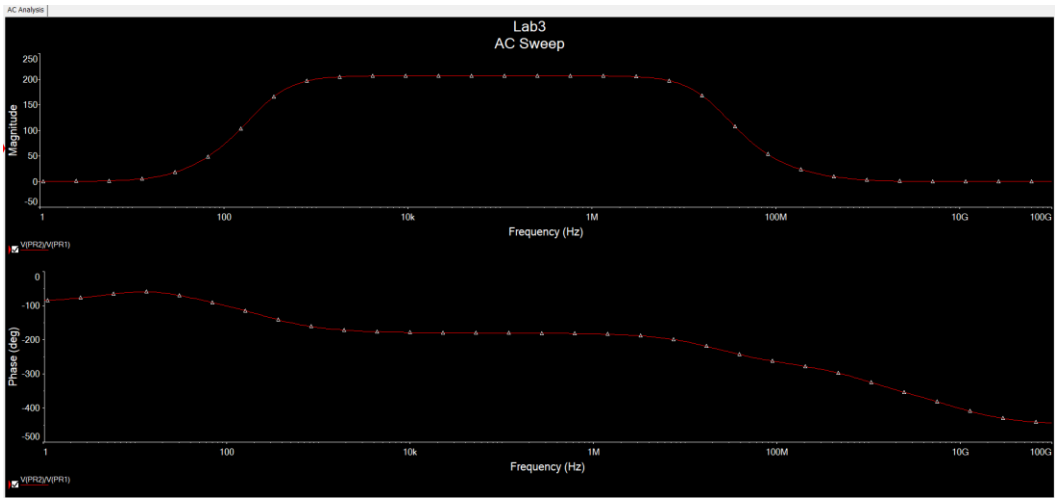
introduced by the feedback network. The specific effect of feedback on the amplifier depends on the type of feedback circuit used, the frequency response characteristics of the amplifier, and the specific application requirements.

Procedure:

Schematic of Amplifier without FB circuit



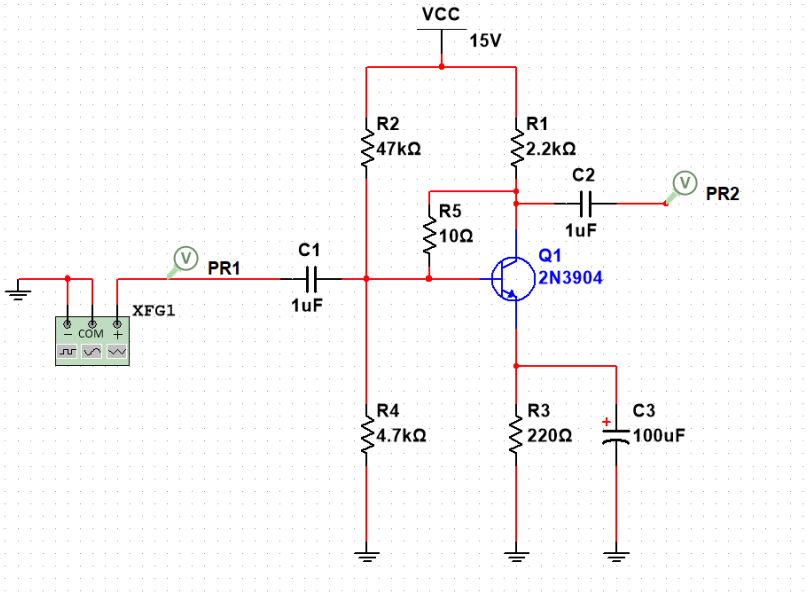
The frequency response curve

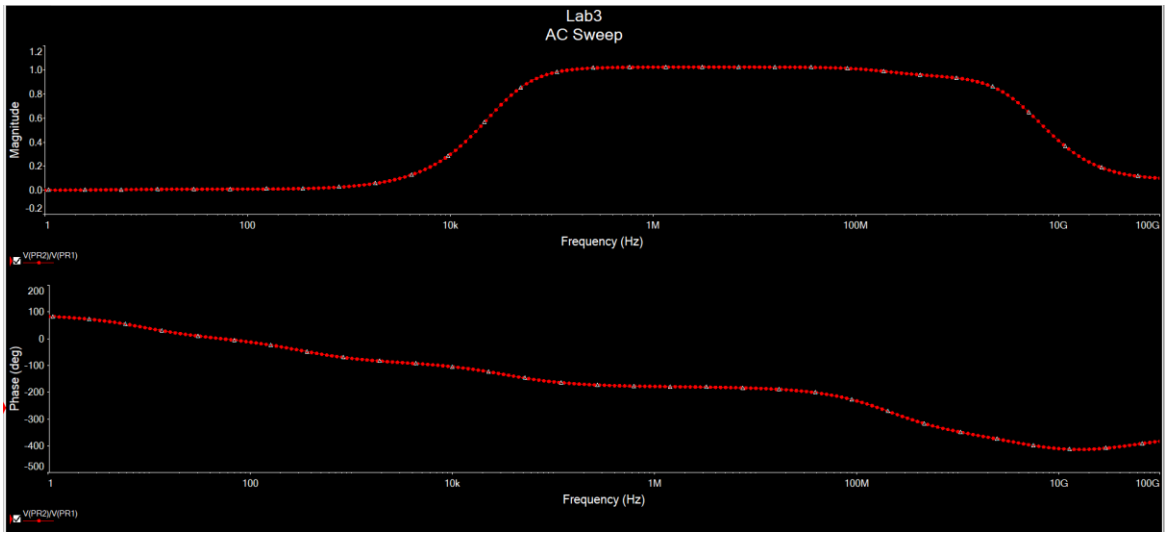


Comment:
We notice that the gain ratio(V(Pr2)/V(Pr1)) is around 200, And the effective band width from nearly 500 HZ up to 80MHZ.

The effect of FB circuit on frequency response

In case of **Rf=10 ohm**:

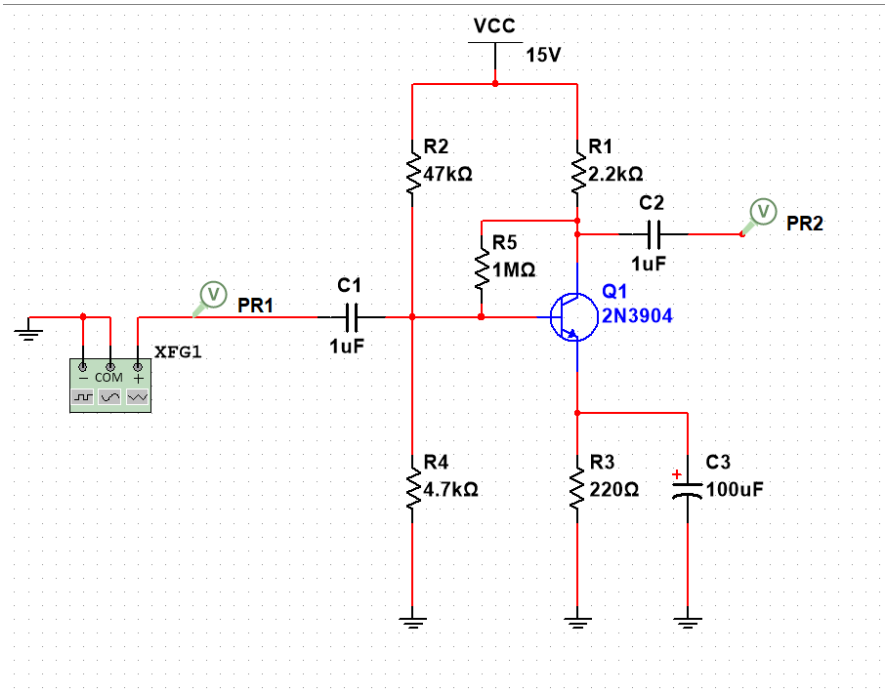


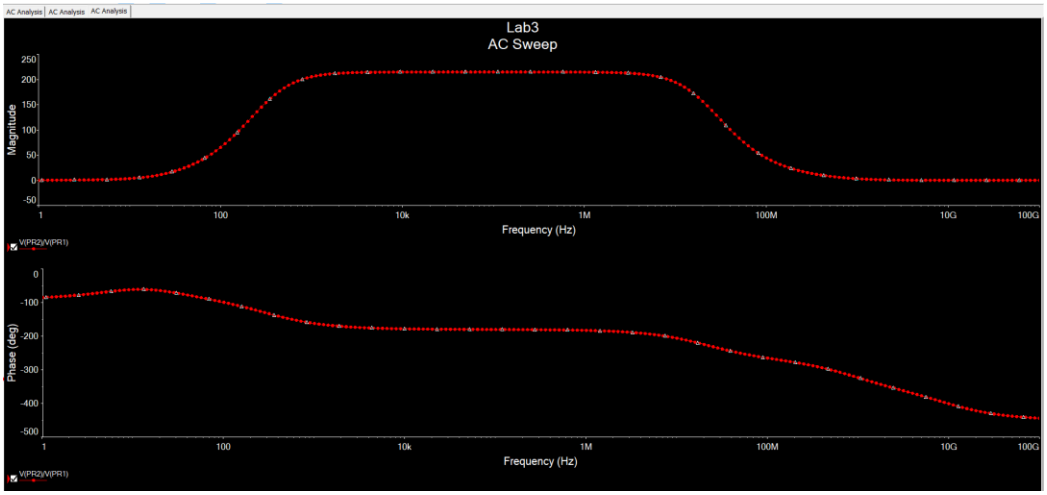


Comment:

From the frequency response curve it's clear that the **magnitude of gain has reduced** greatly (about 1.2) , but on the other hand the range of **bandwidth has enhanced** to include higher frequencies (less than 100kHZ up to 10GHZ).

In case of **Rf=1M ohm**:





Comment:

From the frequency response curve it's clear that the **magnitude of gain and range of band width are almost the same as case of not using Feedback circuit, as** the Rf is very high so that its effect can be neglected on both gain ratio and bandwidth.

Conclusion:

If it's required to enhance the range of bandwidth to operates in high frequencies like RF circuits, using feedback circuit with low resistance in range of ohms will be good solution ,considering that there will be reduction in gain .

So, it's trade-off situation.