

## EE 254: Project 1

### Frequency Response of a Single Stage Common Emitter (CE) BJT Amplifier

#### Design Goals:

- Choose a suitable npn audio BJT from the web. Note:
  - You must not choose the ones available in the lab and 2n222
  - You must choose one that is easily available from ([www.newark.com](http://www.newark.com)).
  - You must choose one for which you can easily find the Spice model.
  - All students must choose a different npn BJT. Please consult with me regarding your choice/s.
- Design a single stage (CE amplifier) with a supply of 5V or  $\pm 2.5V$ . The amplifier must have the following features:
  - Must be bias stable.
  - Must include AC gain stability and emitter bypass capacitor.
  - Maximize gain for undistorted output.
  - Choose suitable coupling capacitors to shape the low end of the frequency response. Consult with me for the lower cutoff frequency. Each student will get a different lower cutoff frequency!

#### Experimental Goals:

- Build your amplifier and make sure all the design goals are met.
- Measure all relevant voltages and the frequency response of the amplifier, carefully noting the lower and upper cutoff frequencies and the mid-band gain.
- Compare the experimentally obtained results with the theoretical model as discussed in class.
- Demonstrate the frequency response and mid-band gain to me.

#### Report Goals: A short report must include the following

- Complete design and choice of components along with circuit diagram and calculations.
- Results obtained and discussion on results. Reasons to why and if the results do not match the theoretical results.

Demonstrations: Projects will be demonstrated in PCTR 1034 during normal class time (only Tuesdays!). The date will be announced at the later stage. The report is due at the time of demonstration. Following times can be used to work on the hardware component of the projects:

Mondays: 5:30 pm to 7:20 pm (PCTR 1030)

Tuesdays: 4:00 pm to 5:50 pm (PCTR 1030)

Wednesdays: 5:30 pm to 7:20 pm (PCTR 1030)