

UNIVERSITY OF MINNESOTA-DULUTH

EE 2212

ELECTRONICS I

---

*Lab 11: Emitter coupled pair*

April 19, 2018

---

*Author:*

Brice JOHNSON

Jonathan MACHLER

*Supervisor:*

Dawson ROSELL

**Abstract**

The emitter coupled pair is a common way to make a differential output system by limiting the current through two transistors. The sum of the current through the transistors is always the same, so differential mode amplification can be done.

# Introduction:

In this lab the DC transfer and transient analysis of the output of an emitter coupled pair with respect to a single input.

# Background:

Emitter coupled pairs

# Procedure:

The LM3046 BJT array is used To make an emitter coupled pair with proper biasing. The resistances given to us in the lab intro are a good place to start. This will affect the SPICE simulation in the future. The input is given a small signal sine wave, via a large wave made smaller by a voltage divider. while the input is set to 1KHz sine wave, the output is measured on an oscilloscope , along with the input for comparison. The O-scope is set to X-Y mode to see the slope of the two lines. The slope of the line is equal to  $A_{dm}/2$ . This result is compared to a SPICE simulation.

Materials needed for lab:

- Breadboard and power supply
- 2n2222 transistors and paired 3046 transistor IC
- Oscilloscope

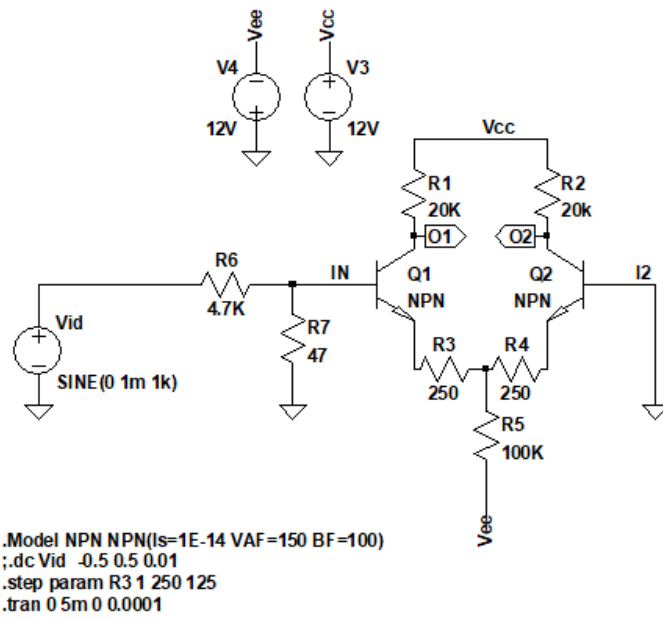
## 1 Schematics

# Measurement and Analysis of Results:

The Slope of the graph was found to be around 1/100, suggesting an  $A_{dm}$  of 1/50. This is a poor  $A_{dm}$ , and This is an error in calculation. The real value is 50, or about 40dB.

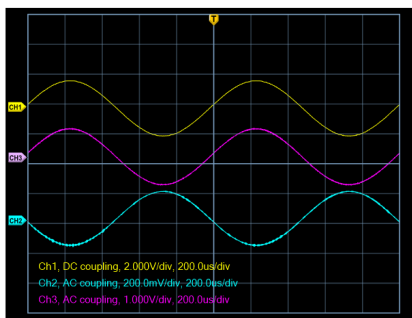
# Conclusion:

Our IV characteristic curve was heavily dependent our our bias and the majority of our lab was figuring out how to correctly bias our circuit. Overall, the results that we got were not very consistent with what should be expected..

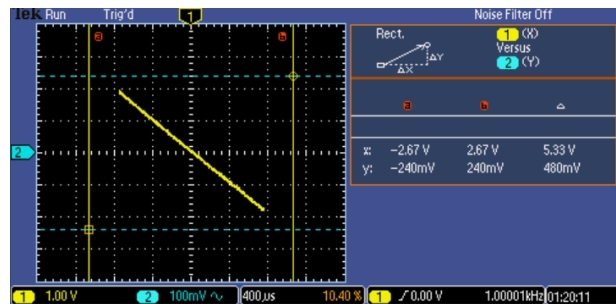


(a) Replica SPICE circuit.

Figure 1: Graph of results.



(a) 2N2222 *inputsvoutut*(blue)



(b) XY characteristic curve

Figure 2: Circuit Results.