ECE 320 - Homework #6

H-Bridge, DC to DC Converters. Due Monday, October 2nd, 2017

H-Bridge

1) Assume $\beta = 100$ (worst case) for each transistor. Determine the currents and voltages for the following H-bridge



2) Redesign the above circuit to meet the following requirements:

Input:

• Four binary signals, ABCD, each 0V/5V, capable of driving up to 25mA

Output:

• 25 Ohm load

Relationship:

- Inputs ABCD can cause the load to see
 - +200mA +/- 30mA
 - -200mA +/- 30mA
 - 0mA

3) Check your design in PartSim (or similar program) for the three modes of operation in the requirements

Lab)

4) Build your redesigned circuit in lab and verify its operation. For the load, use

- A DC motor, or
- An 8 Ohm speaker (with 16 Ohms added to it)



Analysis:

- 5) For the above DC to DC converter, determine
 - The voltage at V1
 - DC value (mean)
 - AC value (peak-to-peak)
 - The voltage at V2
 - DC value (mean)
 - AC value (peak-to-peak)

Design:

- 6) Redesign the above DC to DC converter to meet the following requirements:
 - Input: +12VDC, capable of 3A
 - Output: 100 Ohm resistor
 - Relationship: The voltage at V2 under load is +5V with 100mVpp ripple.
- 7) Check your design in PartSim