Principles of Electronics' Project: Phase 1 (Individual)
Dr. Kavehvash
Deadline: 1399/09/30, 24 PM

In this project, the design and simulation of a differential amplifier (single-ended) are required. Consider these specifications for such an amplifier:

- **Voltage Gain (A_V) ≥ 10^5**
- **Output Swing ≥ 4.4 V_{p-p}**
- **V_{CC} = -V_{EE} = 2.5 V**
- **Maximum Number of Stages = 3**
- **CMRR ≥ 10^6**
- **CMR ≥ 4 V**

Assume these parameters has to be included in your BJT transistors' models:

- $100 \le \beta_{npn} \le 250$
- $30 \le \beta_{pnp} \le 100$
- $70 \le V_{A,npn} \le 150$
- $30 \le V_{A,pnp} \le 70$

What will you deliver in the courseware (credit percentage)?

1. A report consist of
    - Handwritten calculation according to the design (35%)
    - Simulation figures and results justifying your design (30%)
    - A complete table to compare the specifications of your design and simulation (15%)
2. A .sp file providing your Hspice code, compatible with you simulation results (20%)
3. (Optional) An Altium (PCB) file exactly based on your circuit (35%)

P.S.

- Any better specification provides extra credit
- You may also need to watch the video in this LINK to set your output DC voltage.
- For your further questions you may contact this Email:

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