

VE311 Electronic Circuits

Homework 06

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The course homework is intended for the students to learn and to think rather than just copy and paste. This is why, me and my TAs team are confident that you're going to learn.

- Use SPICE to simulate the amplifier in Fig. 1 at a frequency of 1 kHz, and determine the differential-mode gain, common-mode gain, CMRR, and differential-mode and common-mode input resistances. (b) Apply a 250-mV, 1-kHz sine wave as an input signal and plot the output signals using SPICE transient analysis. Use the SPICE distortion analysis capability to find the harmonic distortion in the output.

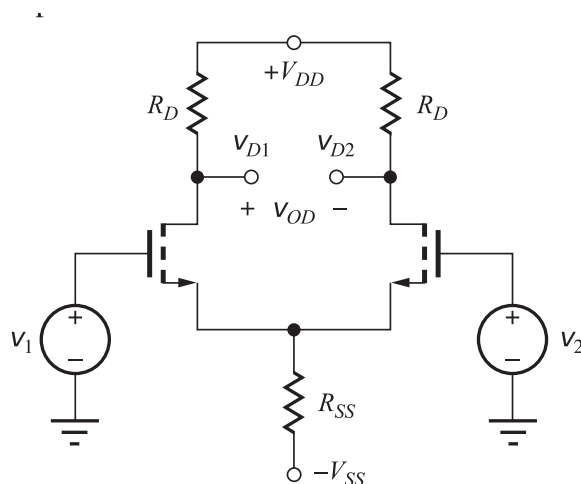


Figure 1: Schematic diagram of a quite interesting circuit

- What are the Q-points for the transistors in the amplifier in Fig. 2 if $V_{CC} = 18\text{ V}$, $V_{EE} = 18\text{ V}$, $R_{EE} = 47\text{ k}\Omega$, $R_C = 100\text{ k}\Omega$ and $\beta_F = 100$? (b) What are the differential-mode gain, common-mode gain, CMRR, and differential-mode and common-mode input and output resistances?

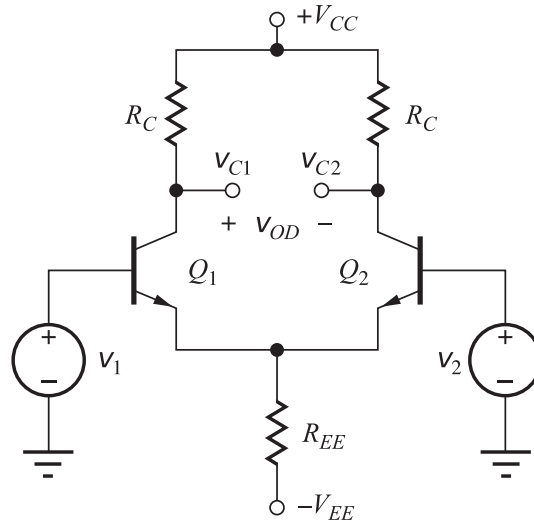


Figure 2: Differential Amplifiers

Reports will require to include a mathematical analysis and the numerical analysis of simulation in Spice.