Assignment 2

October 16, 2023

Total = 15 mark

Note:
(1) Please follow the instructions given.
(2) Plagiarism is strictly not allowed. If violated, zero marks will be awarded to all the stakeholders.

Design and simulate a 2-stage opamp using LT-Spice software in 180 nm technology. Highlight the frequency compensation technique used. The specifications are the following -
1) DC gain $\geq$ 55 dB
2) Unity gain frequency, UGF $\geq$ 100 MHz
3) Phase margin $\geq$ 55 degree
4) Supply voltage, VDD = 1.8 V
5) Power Budget $\leq$ 300 μW
6) The output swing should be as high as possible.

Please use the technology model file for 180 nm from the attachment given in the assignment with the name "PTM-PMOS-NMOS"

Include the following in the submission :-
1) Schematic of the design with all aspect ratios tabulated.   2 mark
2) Operating points of all devices and components.   2 mark
3) Magnitude and phase response plots highlighting DC gain, UGF, and phase margin.   2+2+2 = 6 mark
4) Report input common-mode range (ICMR) and output common-mode range (OCMR).   1+1 = 2 mark
5) Connect the designed opamp in unity feedback configuration and apply 100 mV peak-to-peak sine wave with frequency of 1KHz and frequency of 100 MHz. Plot input and output waveforms for both the cases. What do you infer from the results? Justify it.   2+1 = 3 mark