

III. Simulations

- Simulate the circuit (DC analysis - save operating point, AC analysis)
 - Print all transistor operating point information (DC)
 - Plot the gain and phase versus frequency (AC). Show open-loop gain and PM
 - Plot the common-mode rejection ratio (CMRR)
 - Plot the power supply rejection ratio (PSRR)
- Place the op-amp in a unity feedback (**Buffer**) configuration:
 - Simulate stability using STB analysis and IPROBE
 - Plot STB gain and phase versus frequency (AC) and calculate open-loop gain and PM – What is the difference between those results and previous open-loop AC results?
 - Plot the DC-gain versus V_{out} (report when DC-gain drops by 10dB to verify specifications) – Plot closed-loop (CL) frequency response. What is the A_{CL} and BW_{CL} (comment)?
 - Simulate input-referred noise and tabulate top 4 contributors @10MHz (comment).
 - Simulate the slew rate and verify the specifications.
 - Apply a sine input signal of $1V_{pp}$ @ 10 MHz and plot V_{out} (Add proper input DC value). Plot DFT (in dB) and calculate harmonic distortion (HD2, HD3, and THD) in dB.
 - Plot V_{out} for a small step input of 100mV (Add proper input DC value). Calculate the fractional gain error (FGE) and 1% settling time (compare with hand analysis).

IV. Assessment

This project should be done by groups of 5 students

You are required to deliver a report that contains:

- 1- **Schematic diagrams** (snapshots from Cadence showing dimensions and values)
- 2- **Design procedure** (hand calculations)
- 3- **Simulation results** (snapshots from Cadence)
- 4- **Discussion** of your results and conclusions

Any missing item from the **4 items above will be penalized in the report grading**. Please be aware that ‘bad’ presentation (report document, figures...etc.) of your work is going to affect your grade.

- You should provide the required simulations using **CADENCE**.
- Deadline to submit the project report is **Sunday (5 May 2024) 11:59 pm**
- Any copied reports will be given **Zero**.
- All the equations derivations should be written in **WORD**.
- Project submission will be by submitting a **PDF file** uploaded to google classroom
- The cover page must contain the group names in **Arabic** and their **ID's**.
- All graphs and figures should be clear with readable axes and traces.
- If the students participating in the project ID's are: 9202293, 9202162, 9202038, 9202125 & 9202136 then the report name should be “9202293_9202162_9202038_9202125_9202136 ”.