

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 the closed-loop (CL) frequency response. What is 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 $1V_{pp}$ @10MHz and plot V_{out} (add proper input DC value). Plot DFT (in dB) and calculate harmonic distortion HD2, HD3, and THD (comment).
 - 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

- The total grade of this project is **5 points**.
- **The project can be done by group of 4 students (or less).**
- 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.
- Report size shouldn't exceed **15 pages**. A 0.5 point will be deducted for each extra page.
- Deadline to submit the project report (delivered to Eng. Basem Abdelaziz) is **12/22/2020**.
- Any copied reports or groups more than 4 will be given Zero.