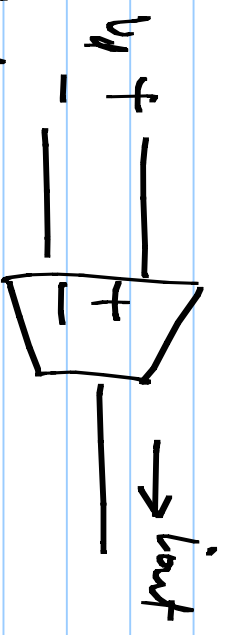
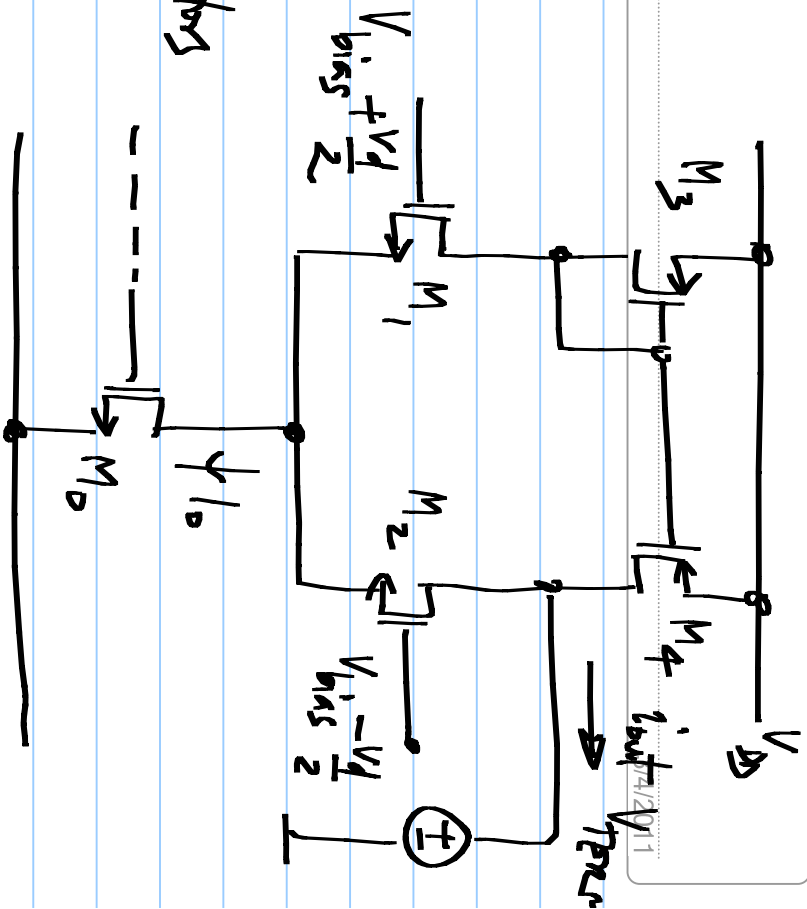


Assignment 4

Note Title

1) The transconductor / single stage opamp is terminated in an incremental short circuit. Assume all transistors are in saturation. Determine the o/p current noise PSD & i/p referred voltage noise PSD.

Consider only thermal noise for all transistors M_{o-s}



2) For the transconductor /

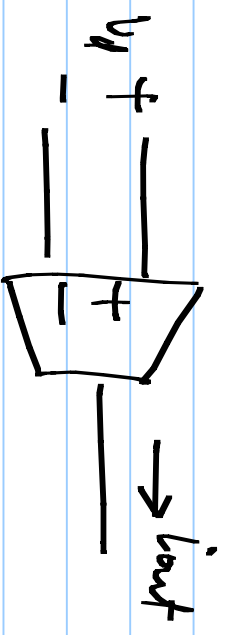
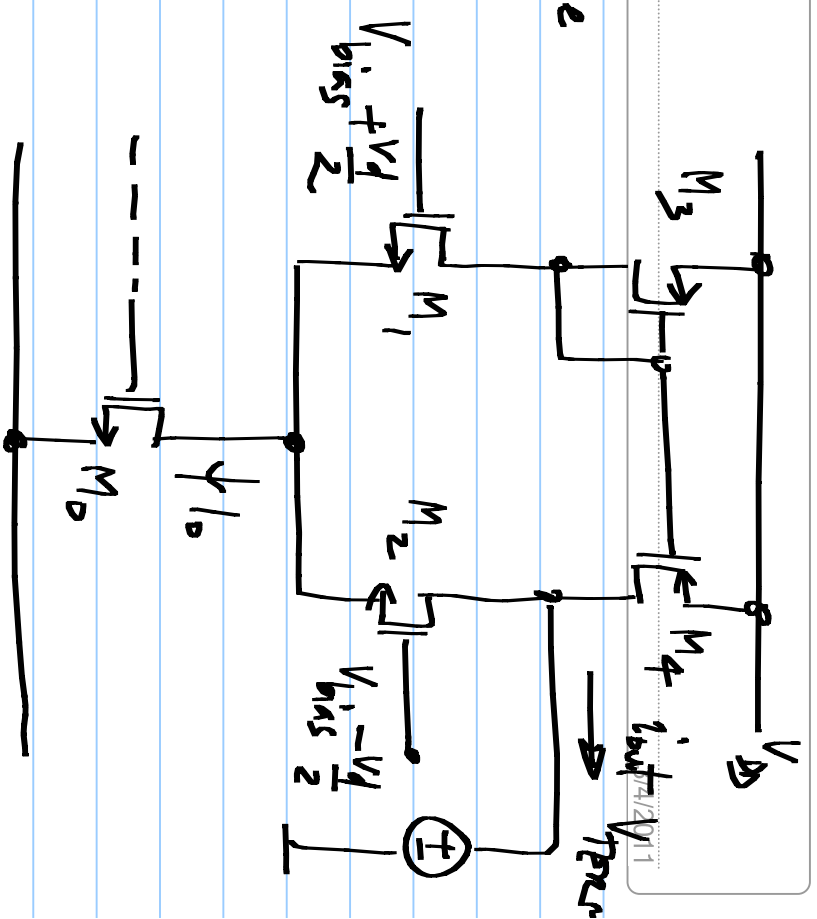
single stage opamp, determine

the standard deviation of the output offset current and the input referred offset

voltage. $\sigma_{V_{T12}}$ & $\sigma_{V_{T34}}$ are the

standard deviations of V

mismatch for M_{12} & M_{34} .



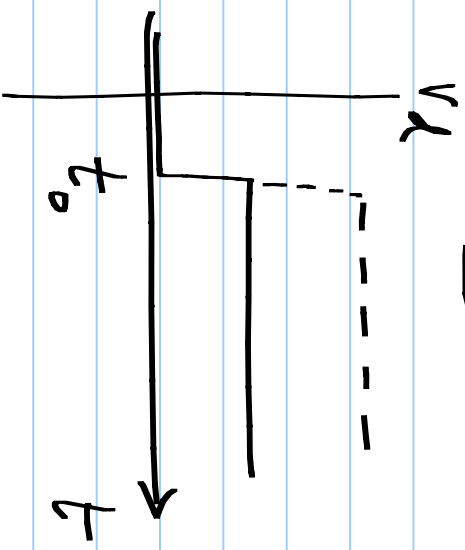
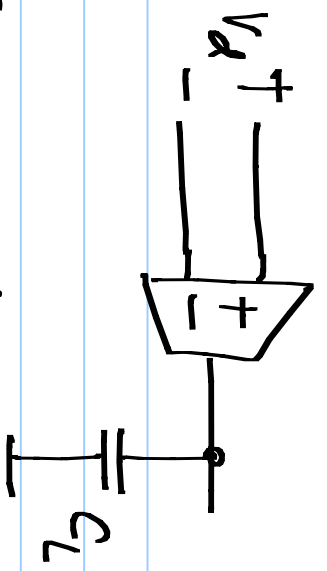
3) For the same trans-

-conductor as above, what

is the output waveform

when a differential step V_d (small) is applied?

What happens to the output as the step size is made larger & larger?



- 4)
- DC gain
 - Unity gain frequency
 - Non dominant poles/zeros
 - Input referred offset- (σ)
 - Input referred noise PSD
 - Positive slew rate ($\max. \frac{dV_o}{dt}$)
 - Negative slew rate ($\max. -\frac{dV_o}{dt}$)
 - Output swing limit-
 - Input common mode swing limit
- { $M_{1,2}: W/L_1, M_{3,4}: W_3/L_3, M_5: W_5/L_5$ }

For the single stage opamp above, make the datasheet with the parameters given here. The answers should be in terms of MOS sizes, V_{dd} , I_0 & some constants.