Lab 2, Analog Integrated Circuits

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# 1) Current mirror circuit

1a) Task: Create a current mirror curcuit in Orcad Capure CIS, which is able to sweep the Parameter output load resistor

A picture containing diagram

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1b) Task: Determine the maximum theoretical load resistor for which by negleting the channel length modulation at the bias point.

is limited by the minimum voltage of , because if M1 will leave saturtion and wil deviate from .

Aber brauchen wir dafür nicht U\_gs, ist zwar vorgegeben durch M2 aber worher in theorie wissen?

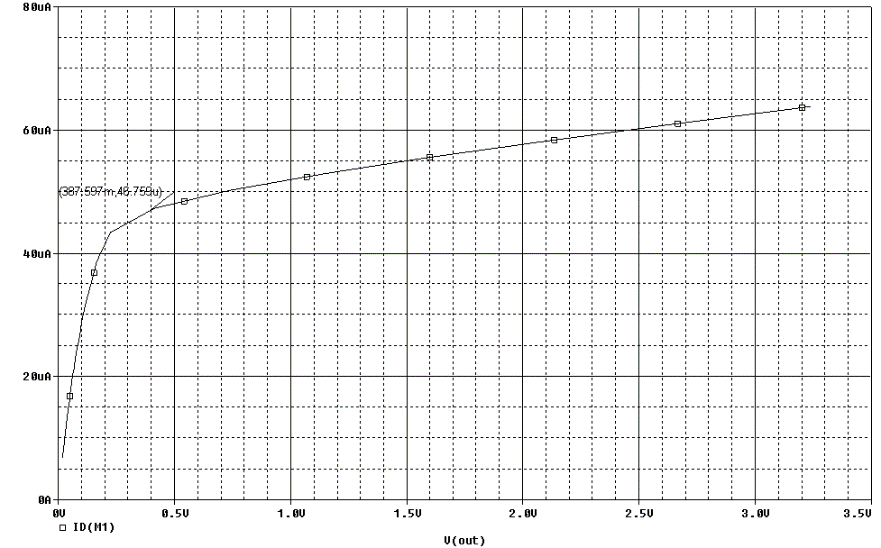
1c) Task: Sweep the load resistor in the simulation to determine the maximum resistor for a constant load current



At the load current changes are the highest dependet on the load resistance, which result that at higher .

Compare 1b) and 1c)

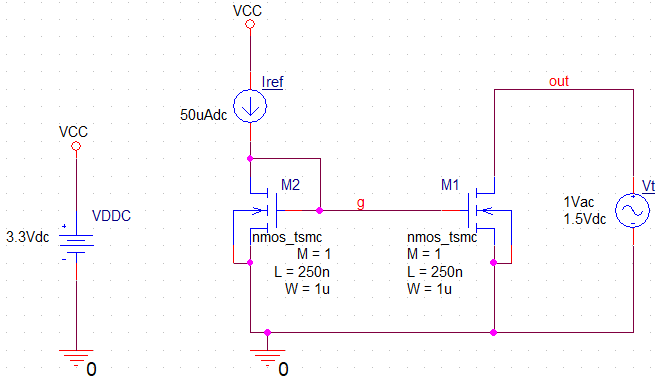
1d) Task: While sweeping the load resistor, plot as a function of to determine the saturation region of M1



The saturation region of M1 can only be rough estimated, but...

Compare 1d) and 1b)

1e) Task: Remove the load resistor and replace it with an AC voltage source to later determine the characteristics of M1.



For the AC analysis all components are linearised. This resulting is used for small signal AC analysis of the circuit.

1f) Task: Sweep between 0V and 3V and plot versus . To determine the minimum voltage with the help of the derivativ of the current . To determine the small signal DC output resistance use 





As expected is the MOSFET M1 at not in saturation

1g) Task:

V\_t = 1,5V



1h) Task:

Mit v\_t = 0,1V



1j) Task:

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1j) Task:



