## ECE 546 SP2024 Homework 10 Solution

\* Instead of using the V/I curve to calculate the on-resistance, this solution used a built-in "*ron*" formula to quickly extract this value from the transistors. Same result can be achieved by following the formula in part 1 of HW9.

1. In order to match the inverter to 50 ohms, the pmos and nmos need to sized separately.

Here is an example of sizing nmos:



 $\leftarrow$  (The width is a variable.)

Then the width of the nmos is swept from 10 um to 200 um in parametric analysis:



Note the output function is OP("/MO" "ron"), a faster way to get the on-resistance.

After the sweep, the width of NMOS = 60.27 um. Similar setup can be used to find the width of the PMOS, which gives 117.62 um.



2. Update the inverter symbol and re-simulate the differential channel. With the same 1.8 V differential excitation, the channel's inputs and outputs are shown below.

