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Lab 1 Report

Video Link:

<https://youtu.be/gDdbAIDQfc4>

Lab Summary:

In this lab, I learned how to draw an IC layout using Synopsys Custom Design Tools. I was able to become familiar using Custom Designer and designed an inverter using a pmos and an nmos transistor. I also designed a testbench in which I integrated the component I designed on a circuit to test if it was working properly. I also learned how to use the Custom Designer SAE to view the waveforms of my testbench schematic.

Figures:

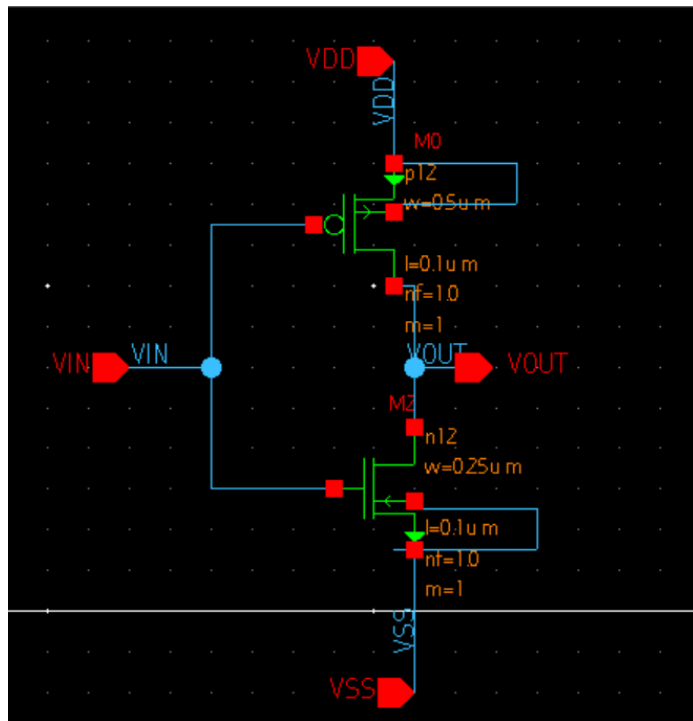


Fig 1. Inverter Schematic

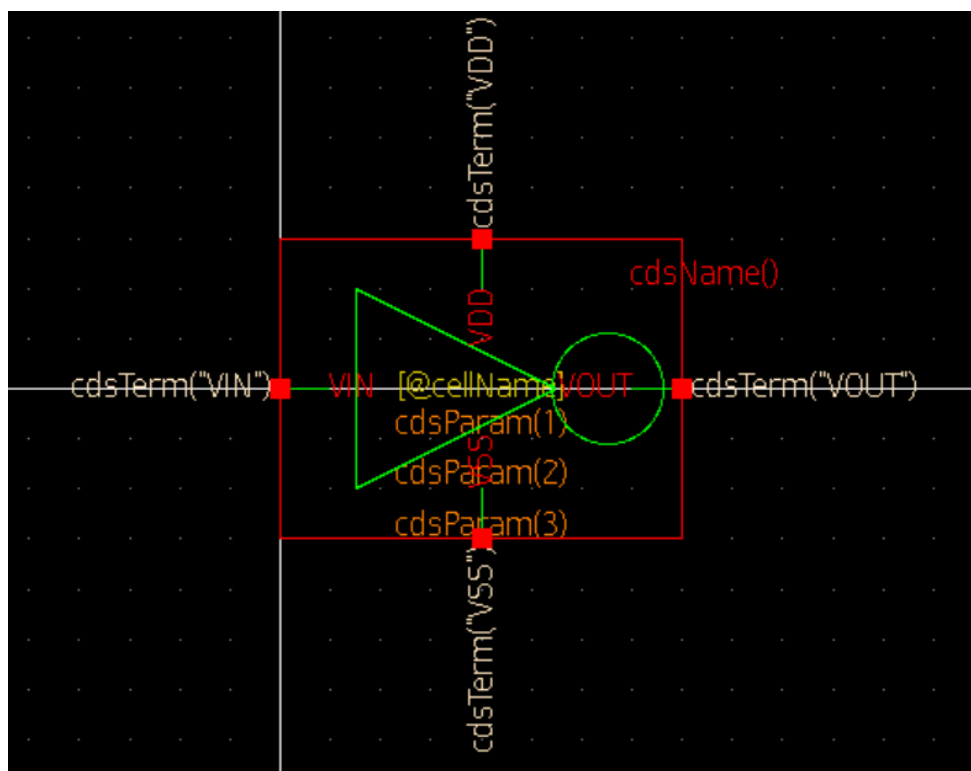


Fig 2. Inverter Symbol

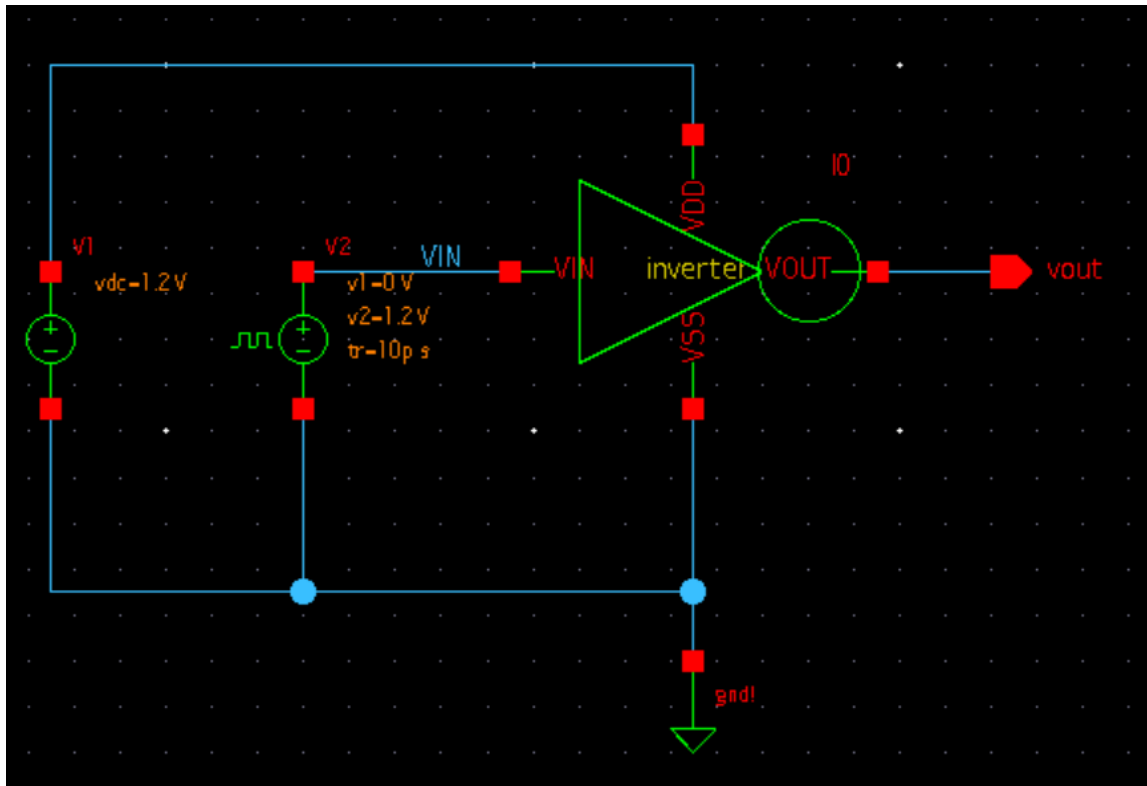


Fig 3. Test-bench for inverter design

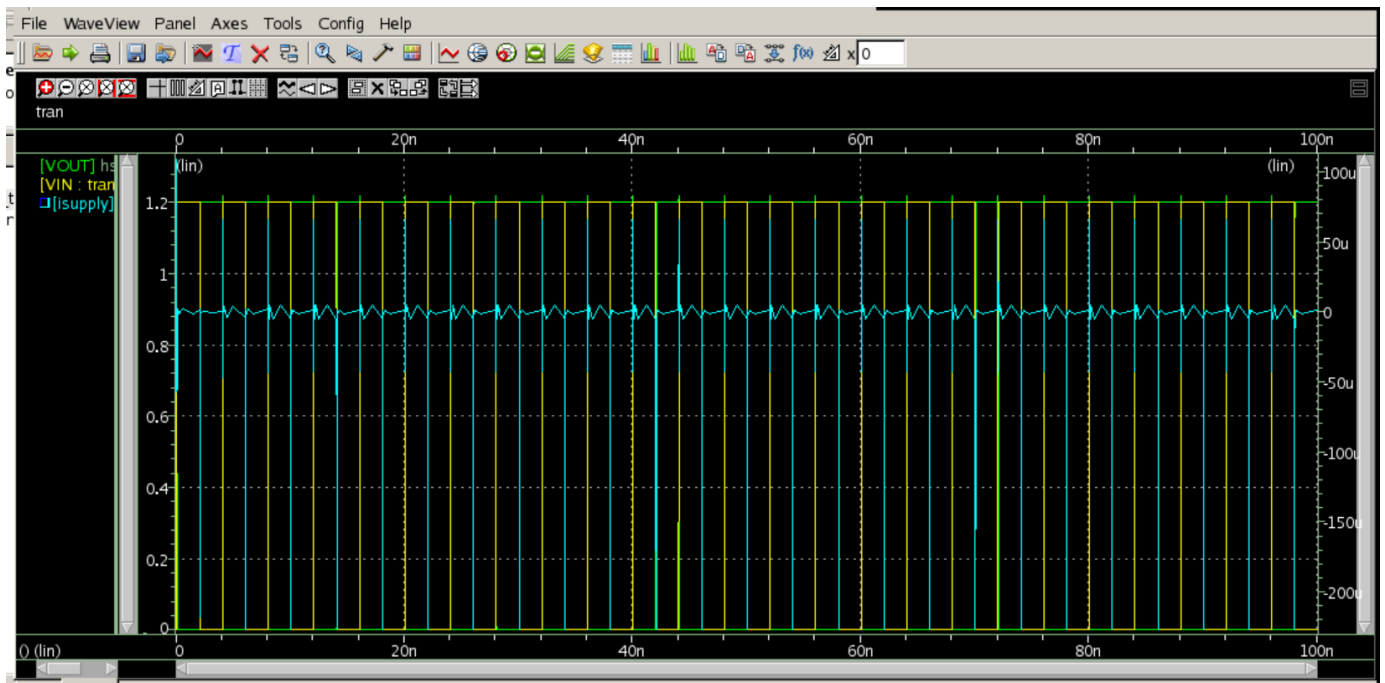


Fig 4. Transient Analysis Waveform

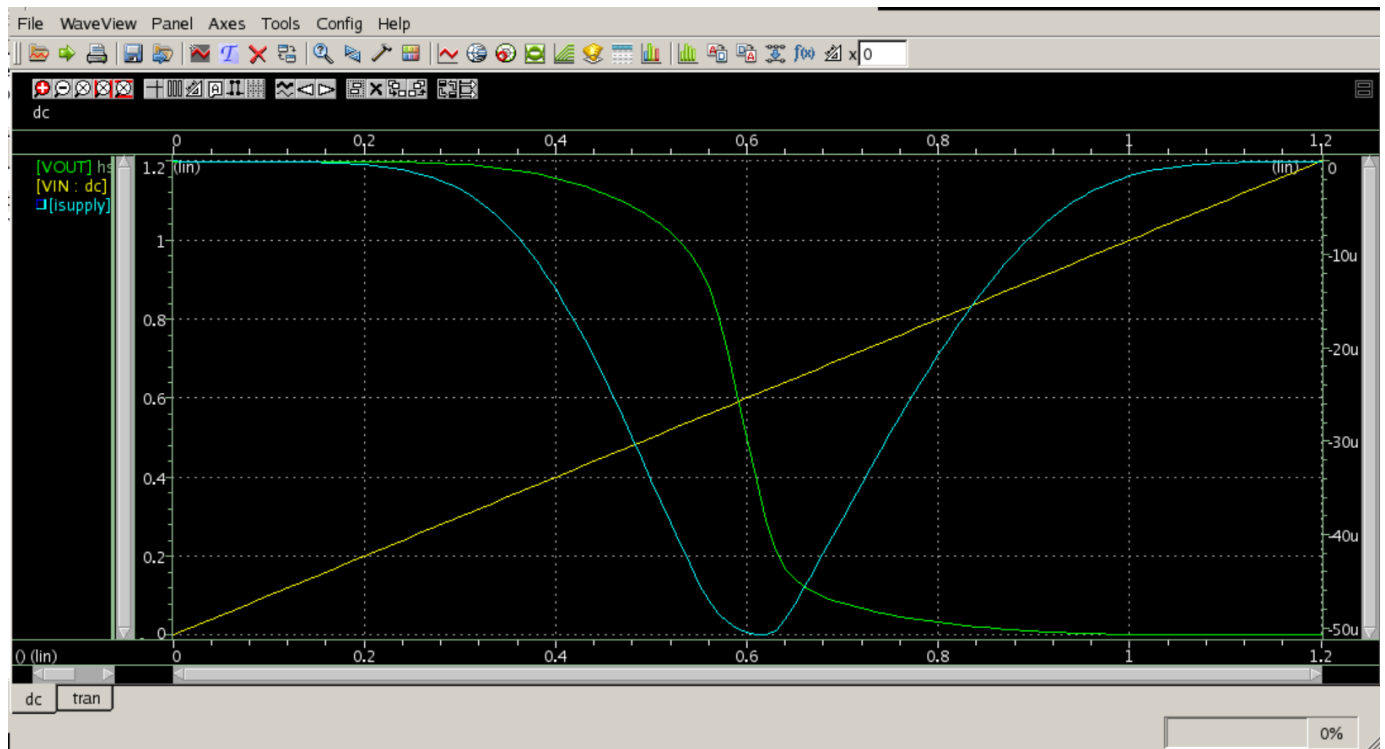


Fig 5. DC Sweep Analysis Waveform

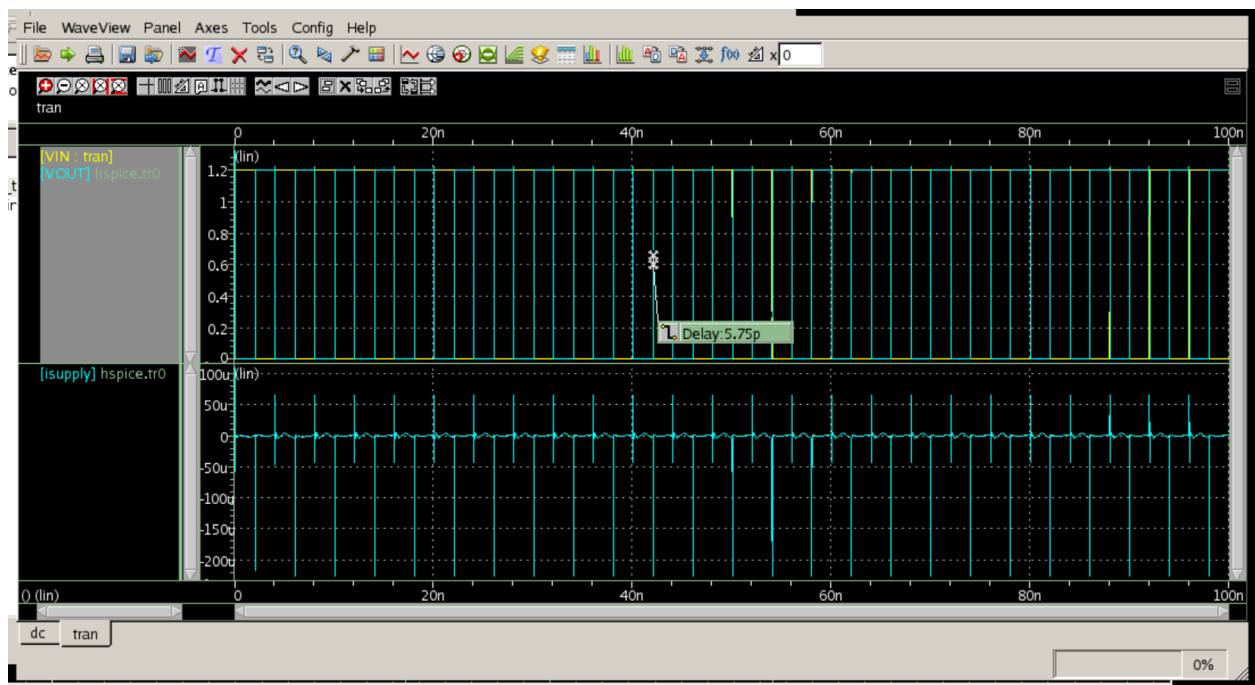


Fig 6. Delay measurement of V_{OUT} and V_{IN} at 50% to 50% annotated waveform

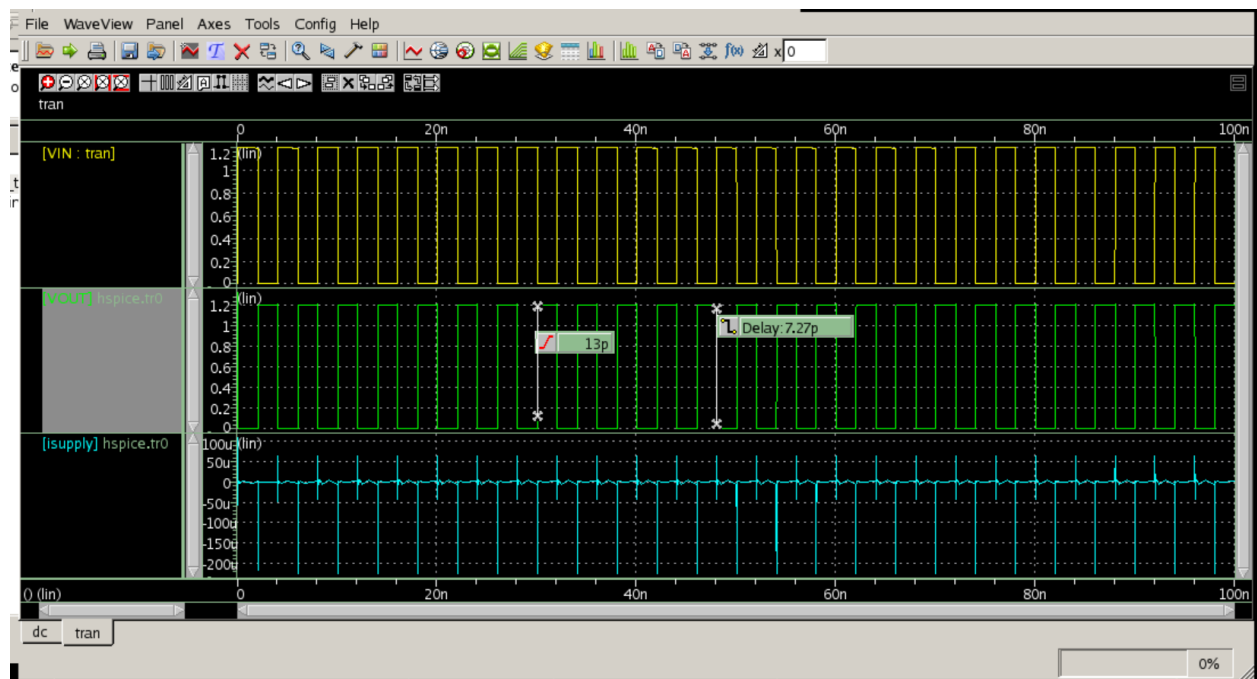


Fig 7. Rise AND fall measurement at 90% and 10% for VOUT annotated waveform

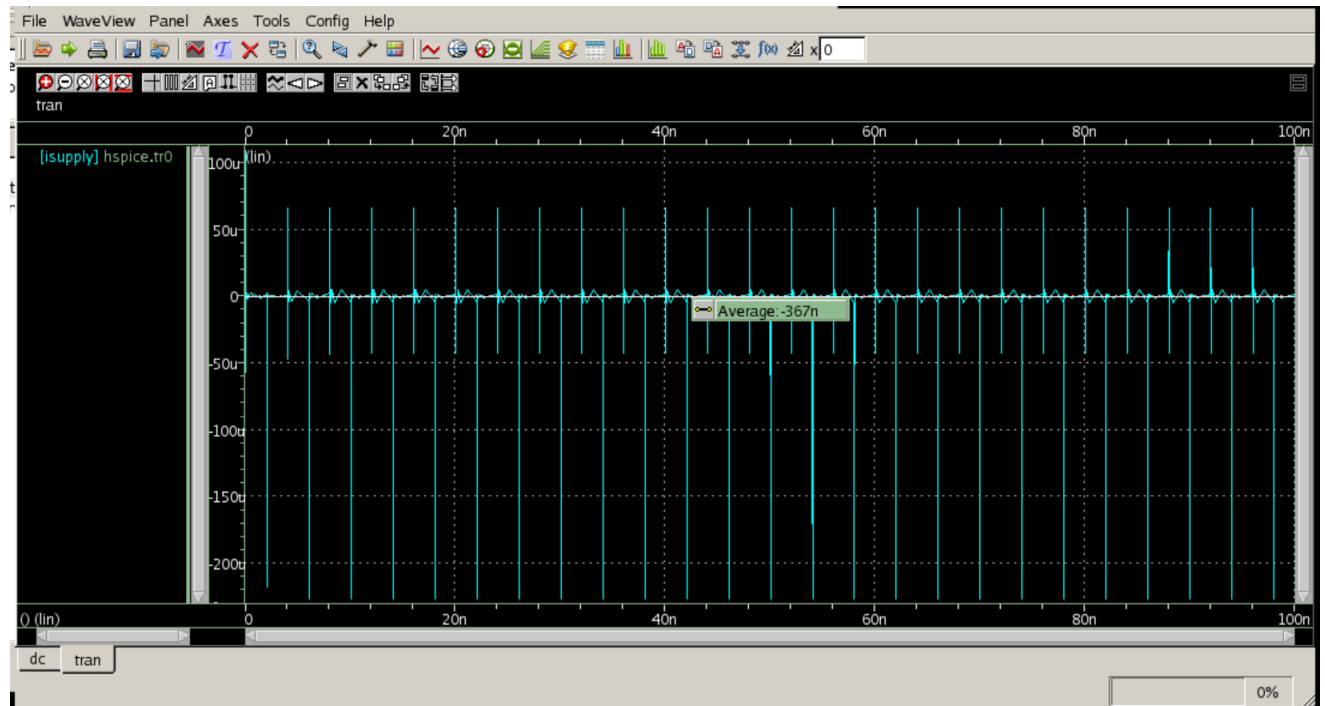


Fig 8. Average current measurement annotated waveform

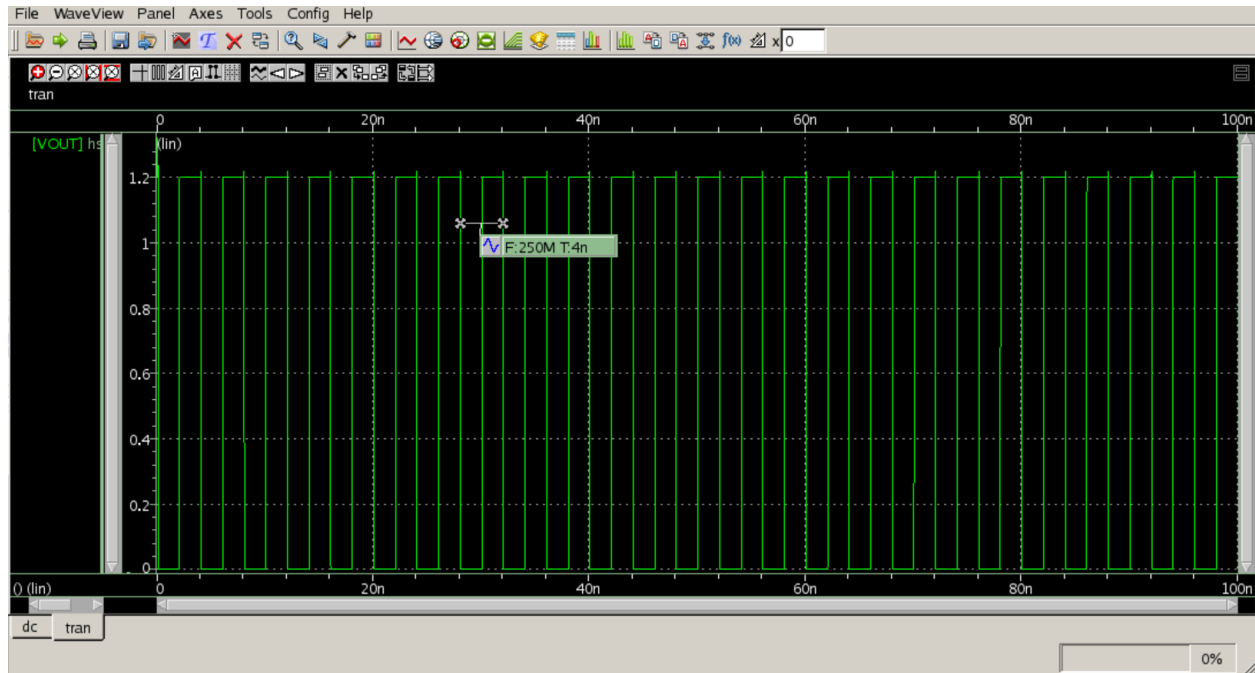


Fig 9. Frequency measurement for VOUT annotated waveform

Issues:

I encountered many problems in this lab. Firstly, I did not have access to any directories on bender. I had to contact BCOE Systems so that I could have permission to the eemaj directory. However, I spent a long time trying to debug and gain access. Next, Xming was not working on my computer. I tried debugging by opening other programs using Xming on PuTTY and I was getting an error even though my setup was correct and Xming said it was connected to the correct host. Eventually, I figured out the issue was Xming so I downloaded Vcxsrv to use as an X server instead. Next, I was able to create the schematic for the inverter on Custom Designer, however, I was unable to type to change the properties on the transistors. I found out that if I need to type, I need to reboot Custom Designer and type the values for the properties I want right after. After some time typing does not work. This means it took longer to complete the lab since I had to reboot Custom Designer about every 10 minutes to be able to type. I also had the issue that I was unable to move screens on Vcxsrv.