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Lab 1 Report

Video Checkoff

https://www.youtube.com/watch?v=tgL9F85B4_E
(Shows inverter test bench design and simulation result with waveforms as well as brief explanation of how to measure parameters.)
*If image clarity is an issue, please increase the quality and increase window size of video

What I learned

In today's lab I learned how to operate many tools that can be used in this course to aid in the design of digital circuits. Specifically, I learned how to remotely connect to the UCR bender server with x forwarding enabled. To achieve this I learned to connect to the UCR VPN and how to configure and run Xming in conjunction with putty. Once ssh'd into bender, I learned how to connect to and utilize custom designer software via bender. Using cdesigner, I learned how to create schematics and cell views of components, all while utilizing Synopsys Custom Design Tools. Additionally, I learned how to test components via testbench simulation and view data via waveform and how to parse that data.
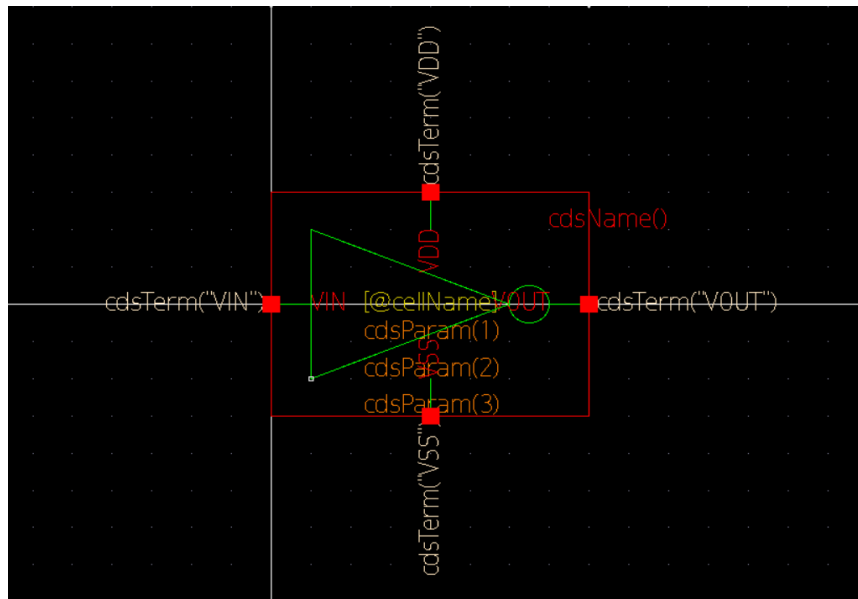
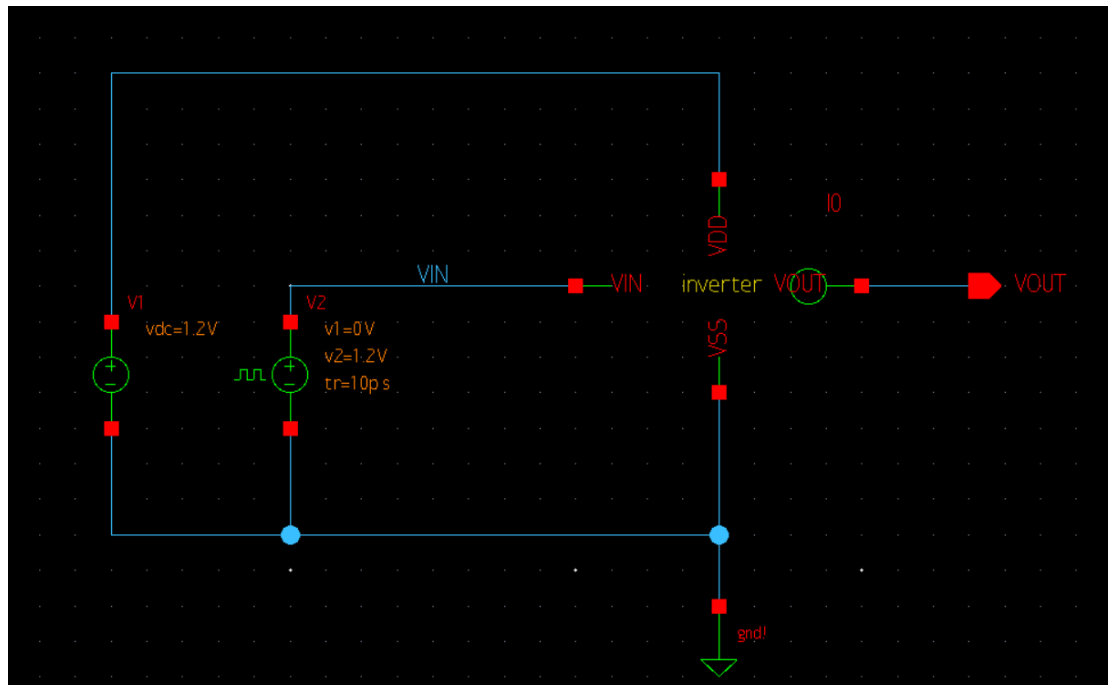## Inverter Schematic View

An inverter schematic view as seen in Fig 13.
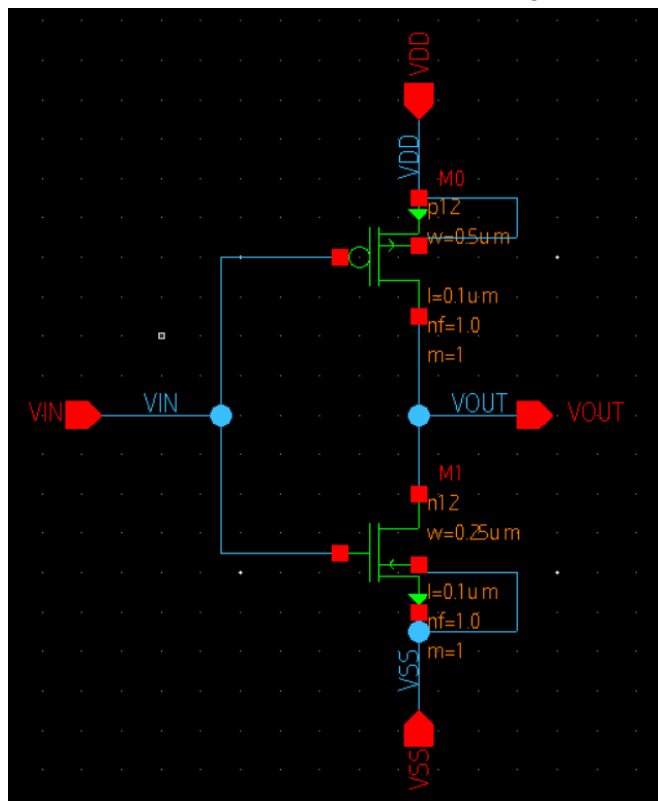
Inverter Symbol View

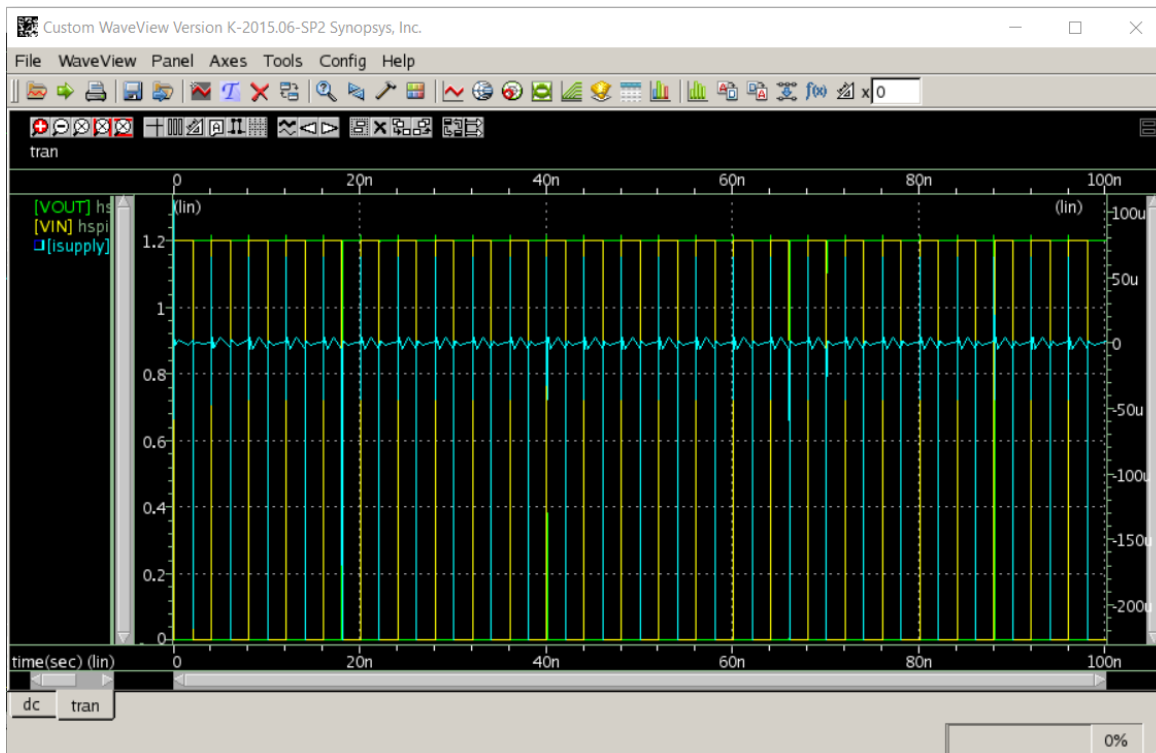An inverter symbol view as seen in Fig 15.

Test Bench for Inverter

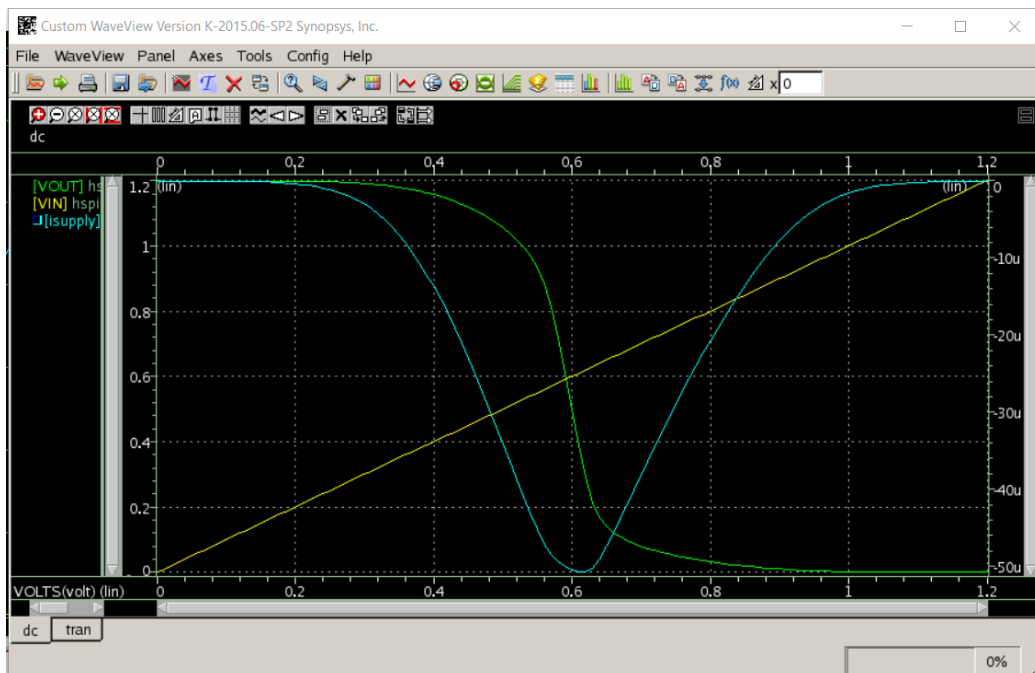A test-bench for your inverter design as seen in Fig 18.

Transient Analysis Waveform

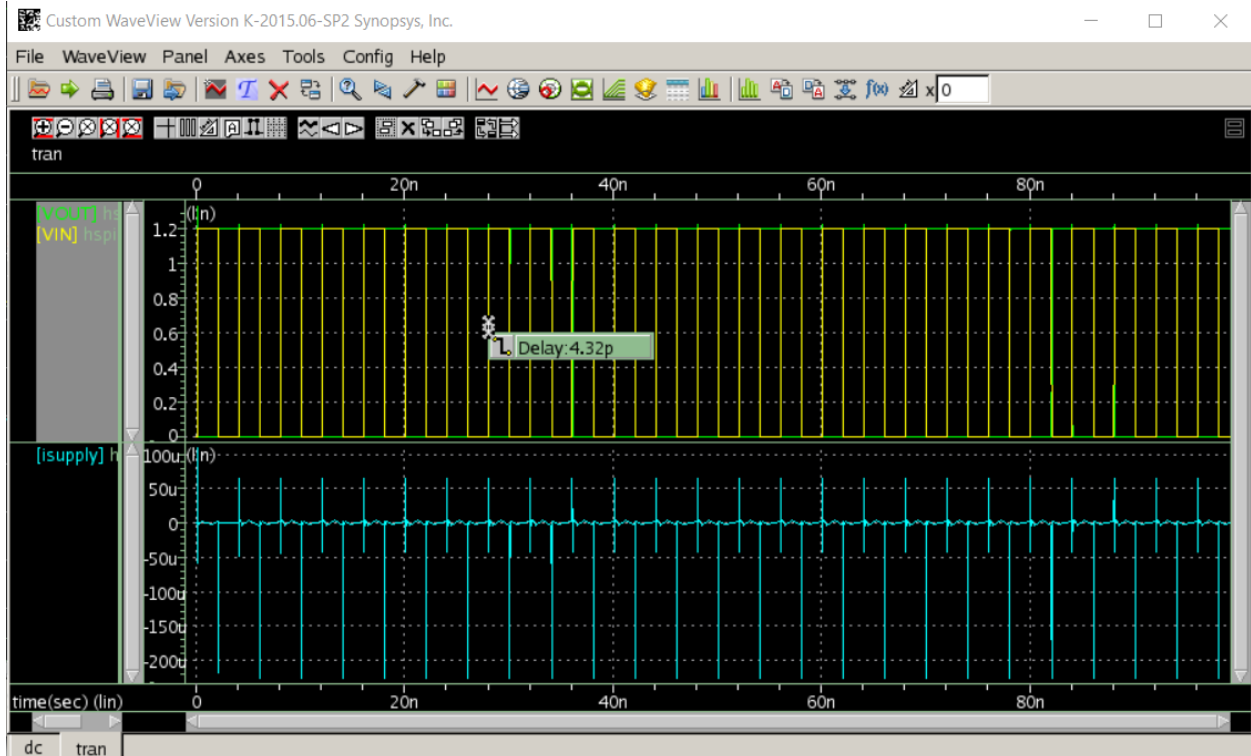A transient analysis waveform as seen in Fig. 28.

DC Sweep Analysis Waveform

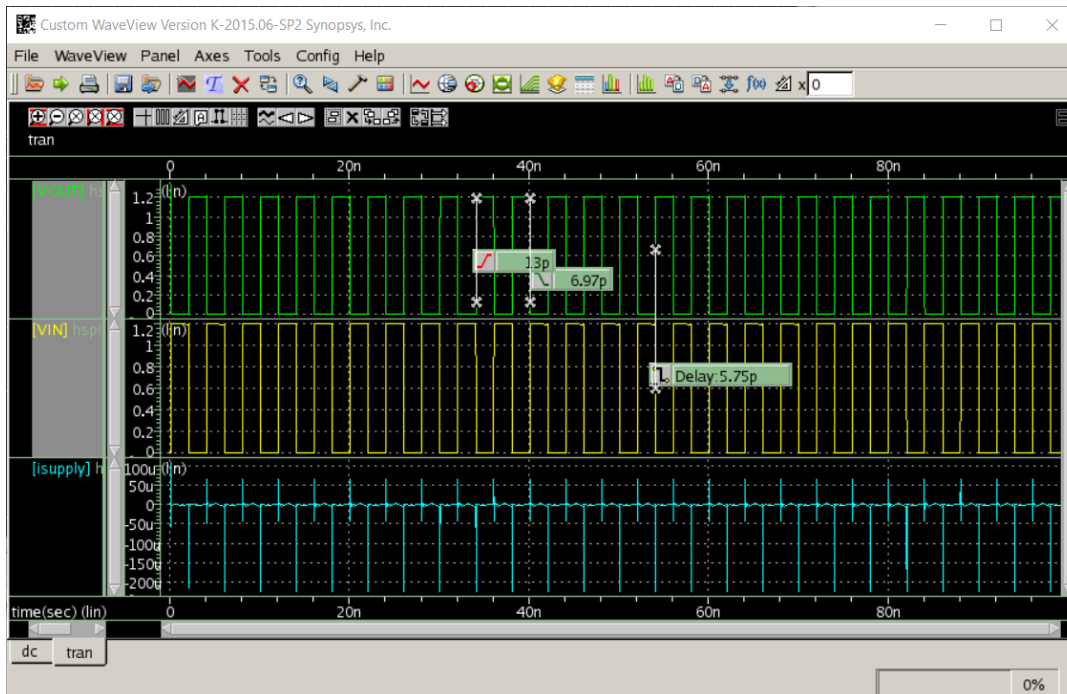A DC Sweep analysis waveform as seen in Fig 29.

Delay Measurement of VOUT and VIN

A delay measurement of VOUT and VIN at 50% to 50% annotated waveform as seen in Fig 33.
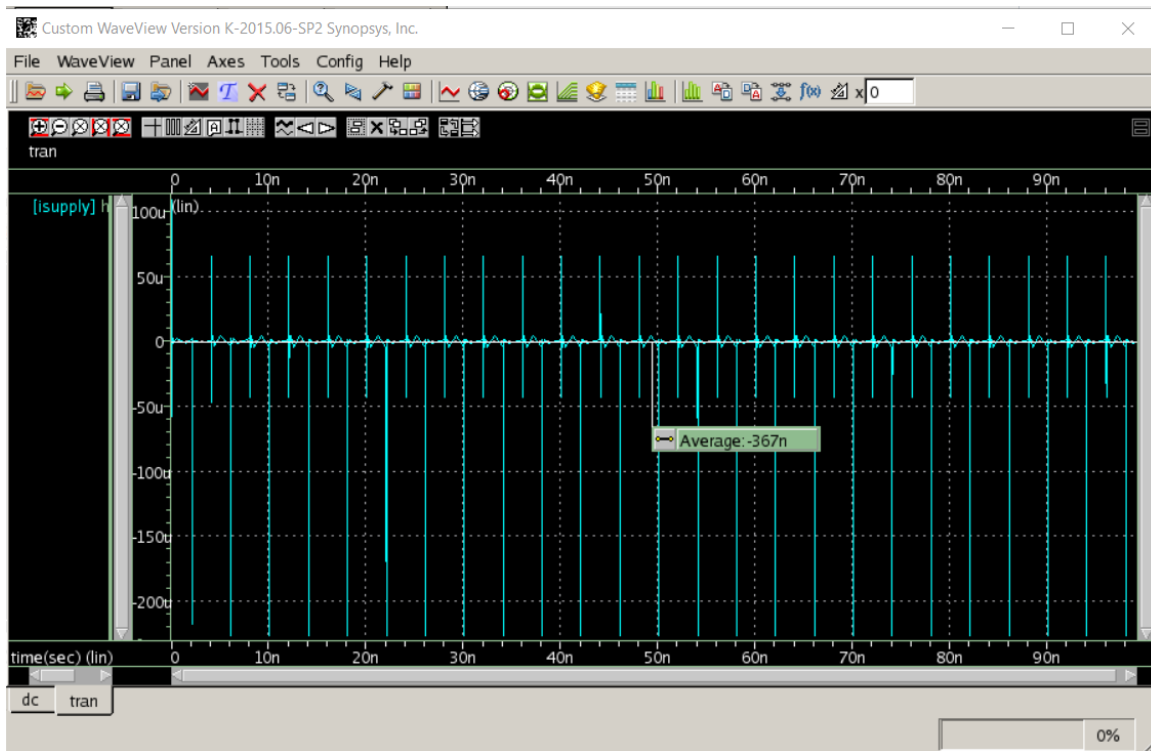

Rise and Fall Measurement of VOUT

A rise AND fall measurement at 90% and 10% for VOUT annotated waveform as seen in Fig 35.
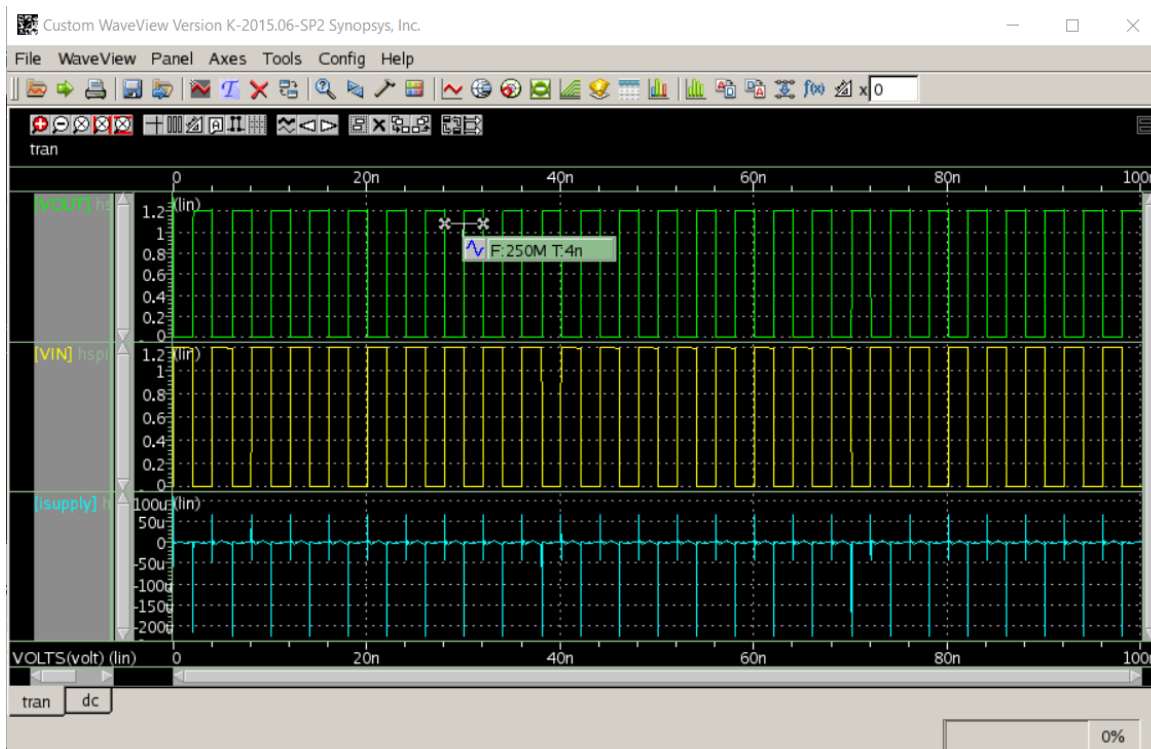
Average Current Measurement Waveform

An average current measurement annotated waveform as seen in Fig. 37.

Frequency Measurement VOUT Waveform

A frequency measurement for VOUT annotated waveform as seen in Fig. 39.

Some Issues I had

One Issue I had during the course of this lab was the creation of the symbol of the inverter cell view. We were instructed to depict the inverter symbol with a triangle and a circle, but I was only able to get the circle to remain on the symbol. Everytime I tried to draw the triangle with the polygon shape (as the doc and the TA showed) the triangle wouldn't stay as seen in my version of fig 18 seen above. Additionally, the lab document suggested drawing the triangle with the path shape with 3 points, but this method also failed to retain the triangle shape. The functionality of my inverter was as it should, the only issue was with the triangle shape not staying on the symbol. Otherwise I had little minimal issues during this lab. My other issues consisted of text boxes not filling out right away, and certain keys not always performing the task they are meant to (such as esc not always exiting the current selection mode) but these were always brief and were likely effects of using the software remotely. Additionally, my final waveform matches the expected waveform data, but my color scheme for VOUT and VIN are the inverse of that seen in the lab doc. This isn't an issue my data matches as it should, but the color scheme differs.