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ECE 6240

Lab#9 Using Verilog as test stimulus

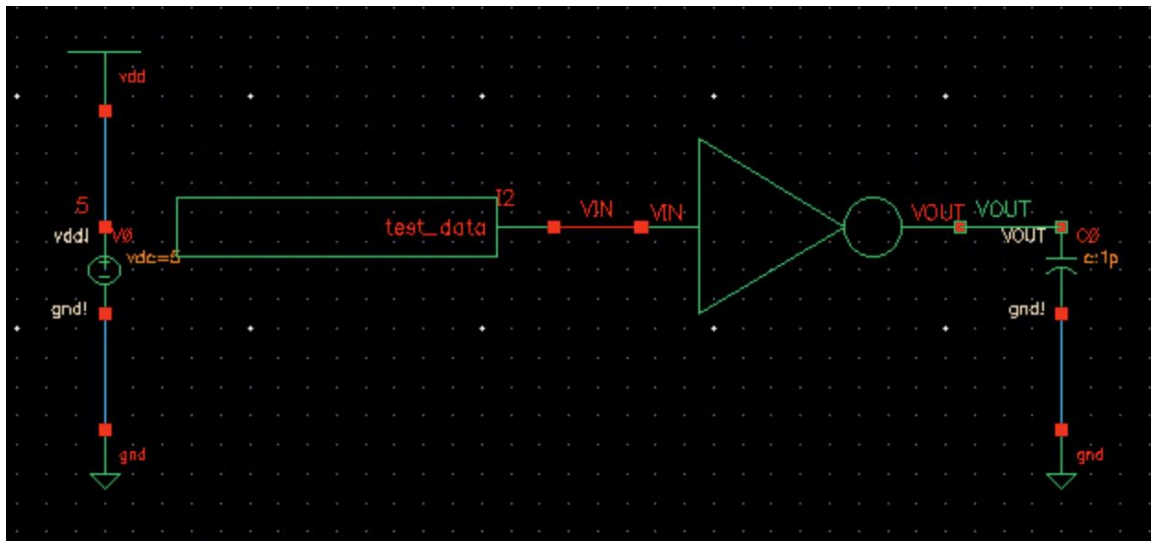


Figure 1 Testbench for Inverter

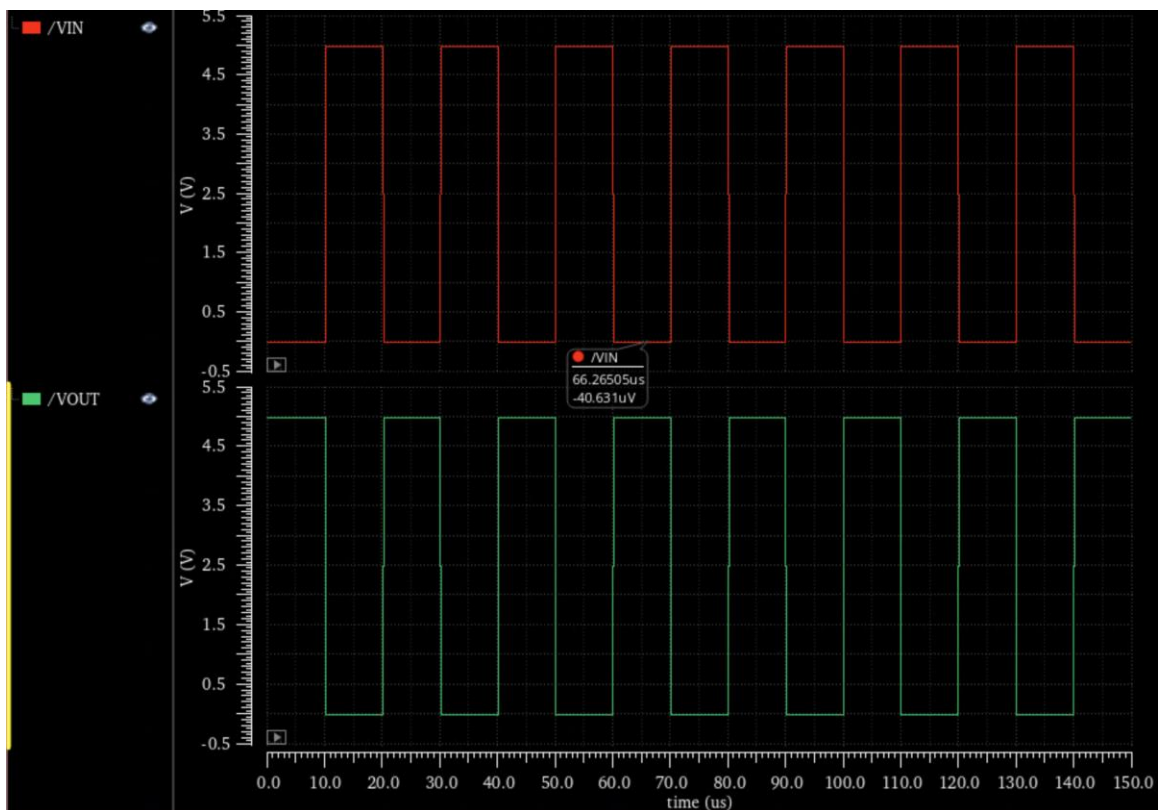


Figure 2 Simulation Result for Inverter

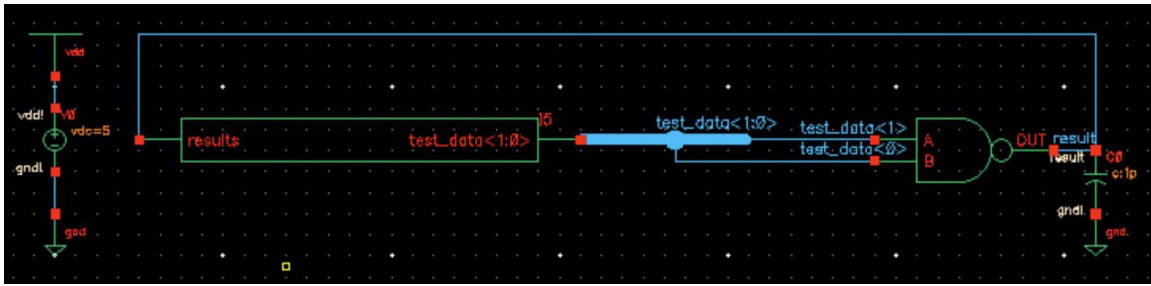


Figure 3 Testbench of NAND

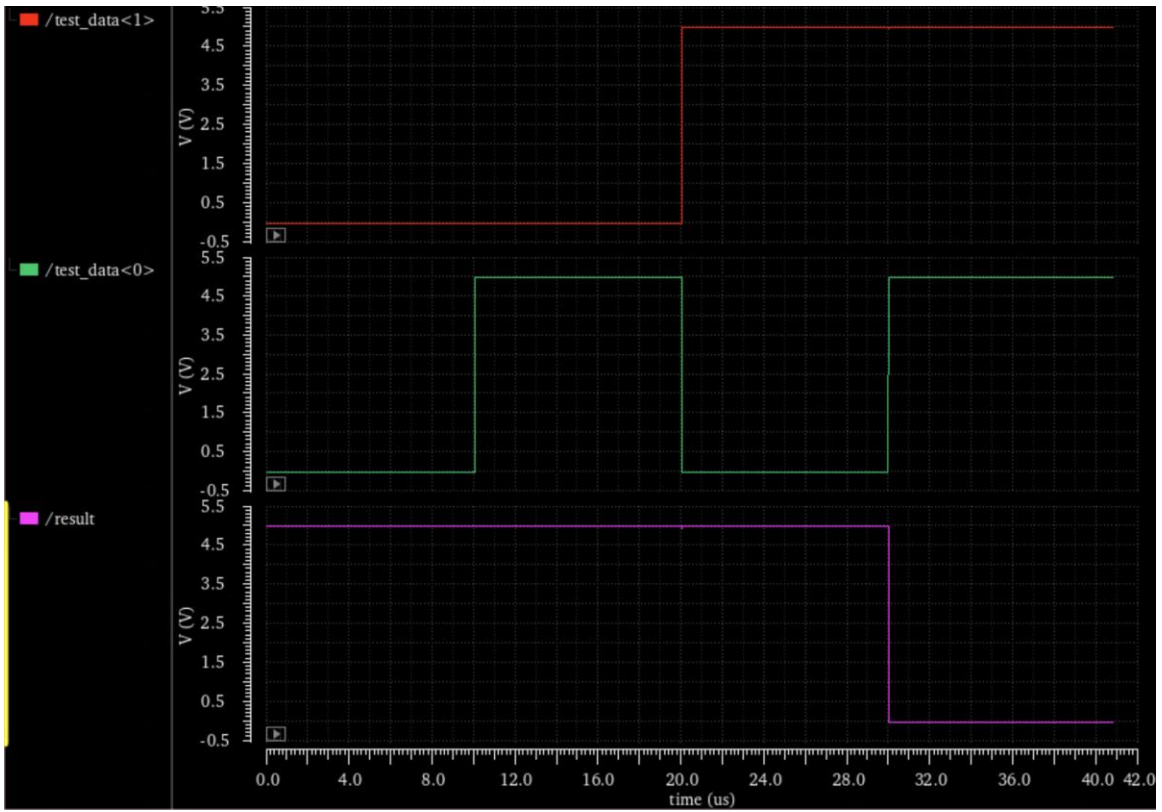


Figure 4 Simulation Result of NAND

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Output and IC/nodeset summary:
      save      3      (voltage)
      0 test_data=00, results=1
PASS: Inputs = 00, output = 1
tran: time = 1.55 us      (3.1 %), step = 800 ns      (1.6 %)
tran: time = 4.55 us      (9.1 %), step = 1 us        (2 %)
tran: time = 6.55 us      (13.1 %), step = 1 us        (2 %)
tran: time = 9.55 us      (19.1 %), step = 1 us        (2 %)
      1 test_data=01, results=1

Notice from spectre at time = 11.0021 us during transient analysis `tran`.
Found trapezoidal ringing on node nand_tb2.I3.6.

tran: time = 11.35 us      (22.7 %), step = 168.6 ns      (337 m%)

Notice from spectre at time = 12.3056 us during transient analysis `tran`.
Found trapezoidal ringing on node nand_tb2.V0:p.
Notice from spectre at time = 13.3056 us during transient analysis `tran`.
Found trapezoidal ringing on node nand_tb2.V0:p.
Notice from spectre at time = 14.3056 us during transient analysis `tran`.
Found trapezoidal ringing on node nand_tb2.V0:p.

tran: time = 14.31 us      (28.6 %), step = 1 us        (2 %)

Notice from spectre at time = 15.3056 us during transient analysis `tran`.
Found trapezoidal ringing on node nand_tb2.V0:p.
Further occurrences of this notice will be suppressed.

tran: time = 16.31 us      (32.6 %), step = 1 us        (2 %)
tran: time = 19.31 us      (38.6 %), step = 1 us        (2 %)
      2 test_data=10, results=1
tran: time = 21.34 us      (42.7 %), step = 122.6 ns      (245 m%)
tran: time = 23.97 us      (47.9 %), step = 1 us        (2 %)
tran: time = 26.97 us      (53.9 %), step = 1 us        (2 %)
tran: time = 28.97 us      (57.9 %), step = 1 us        (2 %)
      3 test_data=11, results=1
      3 test_data=11, results=0
tran: time = 31.27 us      (62.5 %), step = 114.7 ns      (229 m%)
tran: time = 33.82 us      (67.6 %), step = 1 us        (2 %)
tran: time = 36.82 us      (73.6 %), step = 1 us        (2 %)
tran: time = 38.82 us      (77.6 %), step = 1 us        (2 %)

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Figure 5 Printed Result of Simulation