Homework3_310551003

2022年4月11日星期一　下午7:50

Self-Test Exercises

- STE1: Calculate the switching activity EQUATION EXPRESSION of 2-input AND gate and simulate the histogram of transition probability ($P_{0->1}$) vs P_A and P_B.
- STE2: Calculate the switching activity EQUATION EXPRESSION of 3-input NAND gate.

AND

A	B	Out
0	0	0
0	1	0
1	0	0
1	1	1

Assume $P_{A=1} = \frac{1}{2}$, $P_{B=1} = \frac{1}{2}$

Then: $P_{out=1} = \frac{1}{4}$

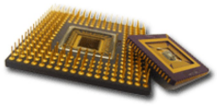
$P_{0\to1} = P_{out=0} \cdot P_{out=1}$

$= \frac{3}{4} \cdot \frac{1}{4}$

$= \frac{3}{16}$

$P_1 = P_A P_B$, $P_0 = 1 - P_A P_B$

$P_{0\to1} = P_0 P_1 = (1 - P_A P_B) \cdot P_A P_B$



NAND

A	B	C	Out
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

Assume $P_{A=1} = \frac{1}{3}$, $P_{B=1} = \frac{1}{3}$, $P_{C=1} = \frac{1}{3}$

Then $P_{out=1} = \frac{7}{8}$

$P_{0\to1} = P_{out=0} \cdot P_{out=1}$

$= \frac{1}{8} \cdot \frac{7}{8}$

$= \frac{7}{64}$

$P_0 = P_A P_B P_C$, $P_1 = 1 - P_A P_B P_C$

$P_{0\to1} = P_0 P_1 = P_A P_B P_C \cdot (1 - P_A P_B P_C)$