Bubble Pushing
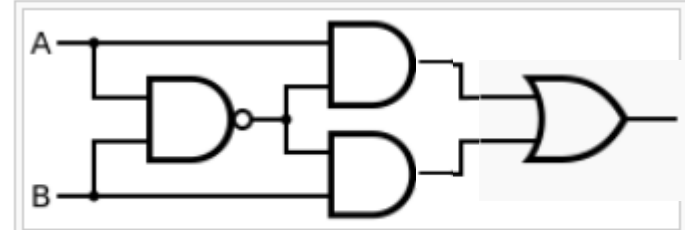
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Please send corrections (or suggestions) to youngwlim@hotmail.com.

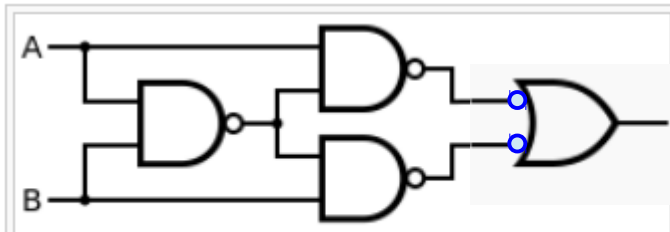This document was produced by using OpenOffice and Octave.
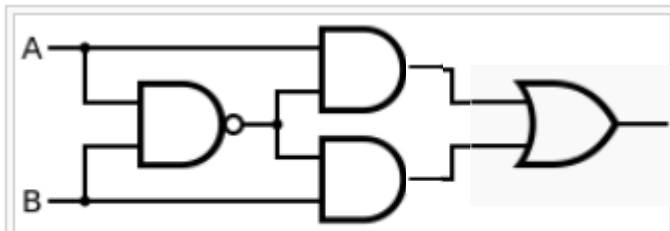
XOR Gate
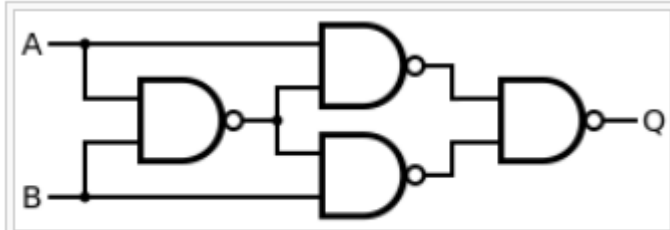
XOR gate circuit constructed using only NAND gates.

XOR gate circuit constructed using only NAND gates.

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XOR gate circuit constructed using only NAND gates.
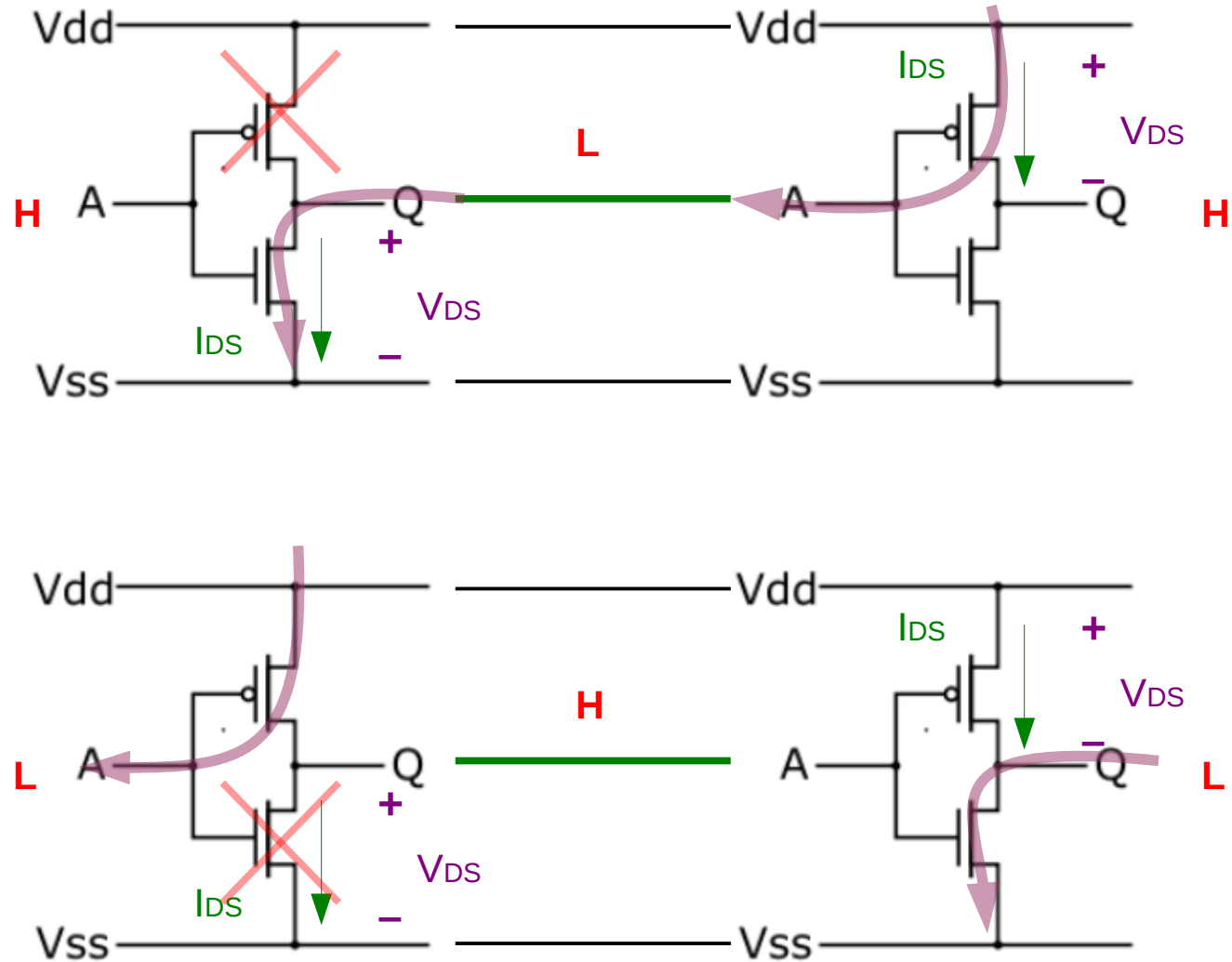
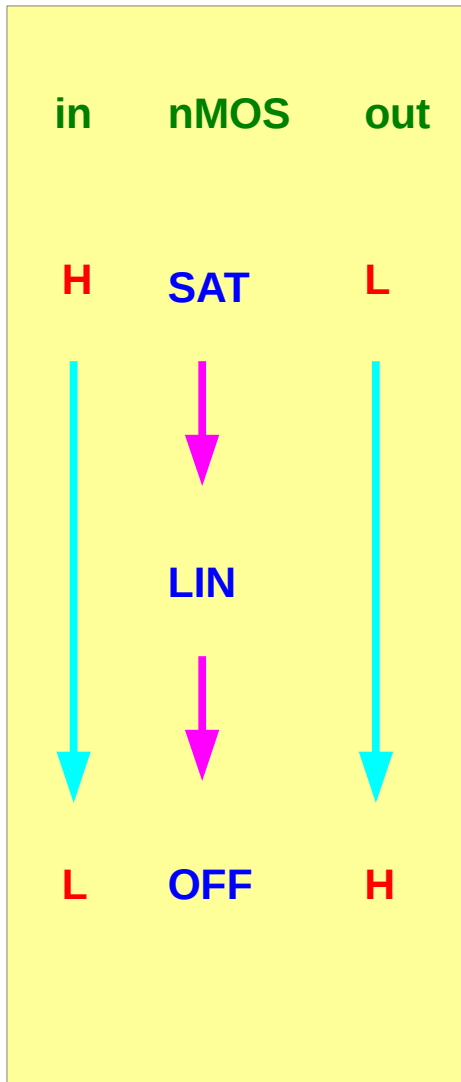$$\overline{A \cdot B} \;=\; \bar{A} + \bar{B}$$

$$A \cdot \overline{A \cdot B} \;=\; A \cdot (\bar{A} + \bar{B}) \;=\; A \cdot \bar{B}$$

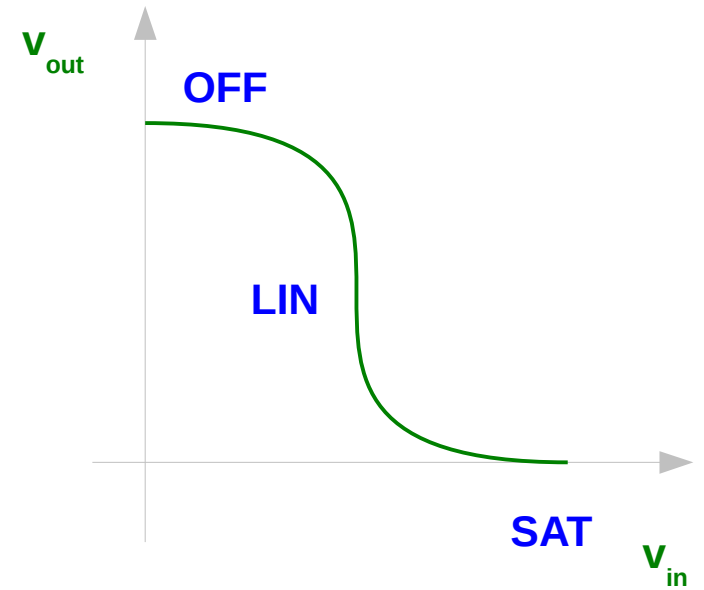$$B \cdot \overline{A \cdot B} \;=\; B \cdot (\bar{A} + \bar{B}) \;=\; \bar{A} \cdot B$$
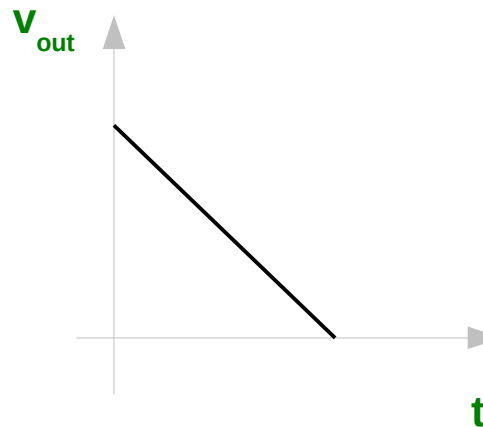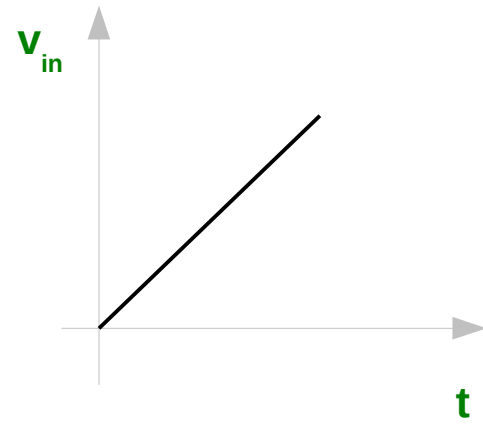
Logic Level

Characteristic Curve

Voltage Transfer Curve (1)

in	nMOS	out
H	**SAT**	**L**
	LIN	
L	**OFF**	**H**

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Voltage Transfer Curve (2)

in   nMOS   out

H   SAT   L

LIN

L   OFF   H

v_{in}

t

v_{out}

t

v_{out}

OFF

LIN

SAT

v_{in}
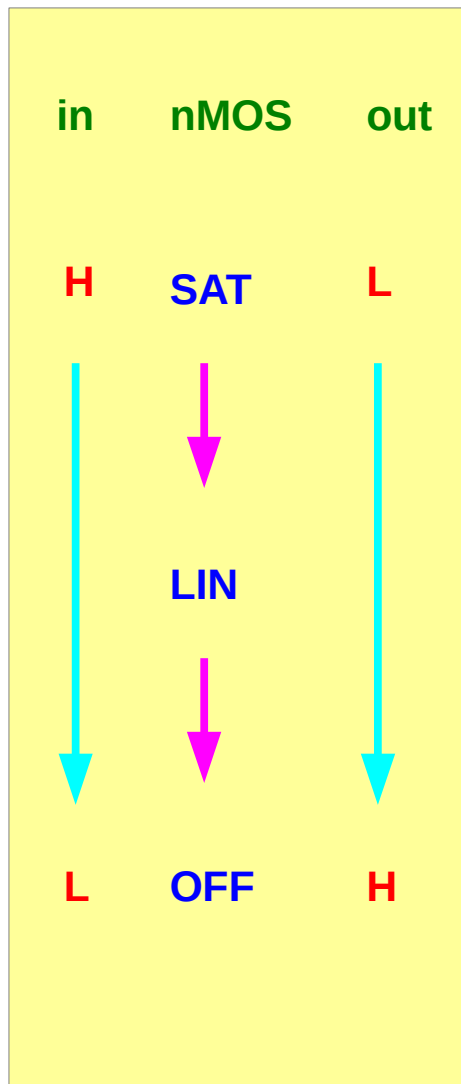
Spice Model

References

[1] http://en.wikipedia.org/
[2] http://www.allaboutcircuits.com/
[3] W. Wolf, "Modern VLSI Design : Systems on Silicon
[4] N. Weste, D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective"

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