MASSACHVSETTS INSTITVTE OF TECHNOLOGY
Department of Electrical Engineering and Computer Science

6.002 - Electronic Circuits
Fall 2000

Homework #3
Handout F00-020

Issued 9/21/2000 - Due 9/29/2000

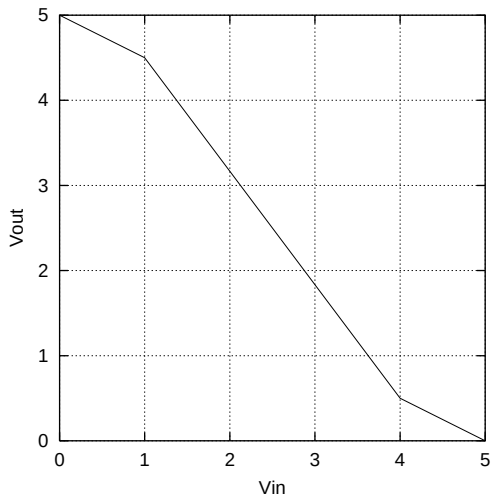
Exercise 3.1: How many different Boolean functions are there of 3 variables? Of *n* variables?

Exercise 3.2: Do Exercise 6, p.216, parts a, b, and d.

Exercise 3.3: Do Exercise 2, p.257 (continues on p.258).

Problem 2.1: Do Problem 2, p.217.

Problem 2.2: An inverter has the input/output transfer characteristic shown below:



For suitable choices of the voltages V_{OL}, V_{IL}, V_{IH}, and V_{OH} this inverter obeys the static discipline (see Figure 6.7 on page 194 in the notes).

Give values of V_{OL}, V_{IL}, V_{IH}, and V_{OH} that actually achieve the static discipline with a positive noise margin. What is the noise margin you obtained?

Problem 2.3: Do Problem 9, p.265, but with the following modification: You need only design an inverter that meets the specification; you need not find a minimum area solution. Also, in calculating the area of your inverter you need to consider only the area taken by the gates of the transistors; you may ignore the area taken by source and drain regions and by interconnect.