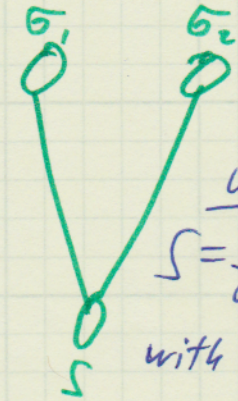
Homework #8: "Boolean functions"

a) Create a simple perceptron (Ising) that solves AND problem:

AND	(-1) 0	1
(-1) 0	(-1) 0	(-1) 0
1	(-1) 0	1



use the following:

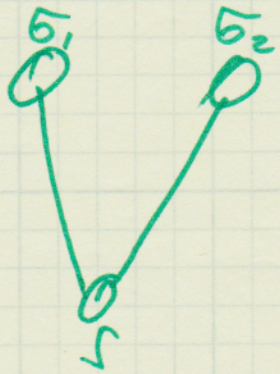
$$S = sgn\left(\sum_{i=1}^{2} w_i \sigma_i - \gamma^2\right)$$

with $sgn(x) = \begin{cases} +1 : x > 0 \\ -1 : x \leq 0 \end{cases}$

$\Rightarrow S \in \{-1, 1\}$

b) Create a simple Ising perceptron that solves OR problem:

OR	(-1) 0	1
(-1) 0	(-1) 0	1
1	1	1



c) Create a simple Ising perceptron that solves XOR problem!

XOR	(-1) 0	1
(-1) 0	(-1) 0	1
1	1	(-1) 0

Graduate Homework #8 continued (5 points total):

(2) Program in Matlab the Boolean functions (AND, OR, XOR) that can be solved with a simple perceptron, i.e., implement them as a simple perceptron.

The homework is to be submitted electronically via the dropbox on D2L.

Note: please handwrite your homework, no typing, and scan it into a PDF file!

The **homework is due by 11:59pm on Monday, October 30.** The dropbox will be closed after 11:59pm and thus late submissions will not be graded.