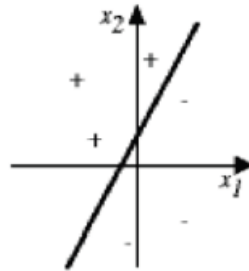


INT301 Bio-computation

Week 6 Tutorial

Question 1.

Suggest values of weights w_0 , w_1 , and w_2 for the perceptron whose decision surface is illustrated in the figure (the surface crosses the x_1 axis at -1 and the x_2 axis at 2).



Question 2.

Design a neural network with sigmoid units to predict a person's academic role from his webpage. Possible roles are "professor", "student", "staff". However, each person can take any number (from 0 to all 3) of these roles at the same time. Briefly describe:

- (1) How you would represent the role label of a person in your training data;
- (2) Suggest a possible threshold value for the outputs.

Question 3.

The neural network in the figure can be used to distinguish between nails and screws. The training samples in format {(neuro 1, neuron 2), (neuron 6, neuron 7)} are provided as follows: T1{(0.6, 0.1), (1, 0)}, T2{(0.2, 0.3), (0, 1)}, where (1, 0) represents nail and (0, 1) represents screw. Fix the learning rate as 0.1 and initialize the network with the weights indicated in the figure (the bias are given next to the nodes). Show the detailed process of both forward propagation and back propagation in the network using T1 as input.

