Machine Learning

V. Adamchik CSCI 567 Fall 2019

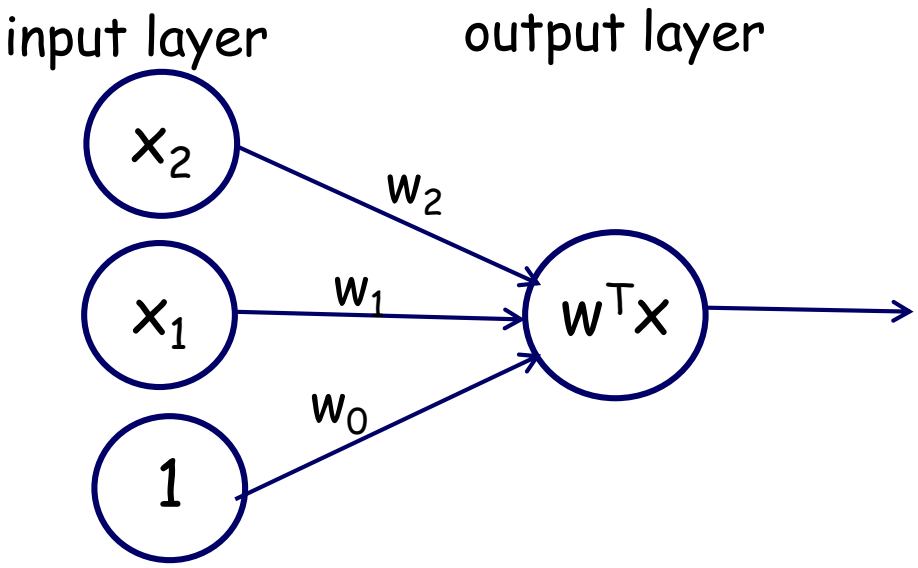
Discussion Set 5 University of Southern California

# Neural Nets

# Problem 1

Perceptrons include a single layer of input units and a single output unit.

They can represent *some* Boolean functions.




Prove why perceptron cannot represent XOR.

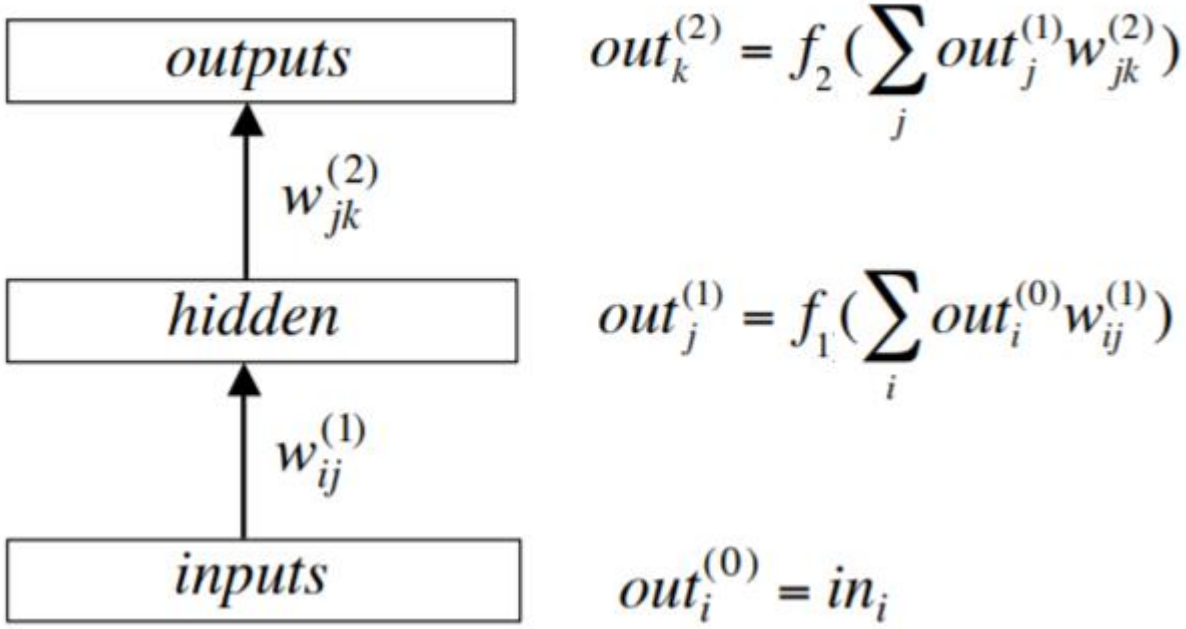
# Problem 2

A neural network with one hidden layer and with a non-linear activation function can perfectly fit an XOR function.

What is the minimum number of hidden neurons required to fit the XOR function?

# Problem 3

Explain why the activation function in NN should <u>not be</u> linear.




$f_1$ and $f_2$ are activation functions.

# Problem 4

Explain why the cost function of neural network is a non-convex with respect to weights **W**?