Assignment #5

No late assignments accepted!

ECE449, Intelligent Systems in Engineering

Fall 2019

Department of Electrical and Computer Engineering, University of Alberta

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Points: 10
Due: Thursday, October 24, 2019, 3:30 PM,
in the assignment box in the ETLC atrium
Note: Show your work! Marks are allocated
for technique and not just the answer.

Student Name:

ID Number:

1. [2 points] Consider a single-input neuron

The input to the neuron is 3.0, its weight is 2.3 and bias is -3.0.

a) What is the net input to the transfer function, *tot* ?

b) Using an activation function of your choice, determine output of the neuron.

2. [3 points] Consider two single-neuron perceptrons with the same weight and bias values

The first perceptron uses the unipolar hardlimit function, f_{hlu}, and the second perceptron uses the bipolar hardlimit function, f_{hlb}. If the networks are given the same input x, and updated with the perceptron learning rule, will their weights continue to have the same value?

3. [5 points] Consider two types of activation functions

Logistic sigmoid $y = \dfrac{1}{1 + e^{-tot}}$ (covered in class), and Elliott $y = \dfrac{tot}{1 + |tot|}$ (new in this assignment).

a) Determine derivatives of these functions,

b) Plot graphs of the functions and their derivatives,

c) Compare the functions and describe your observations.