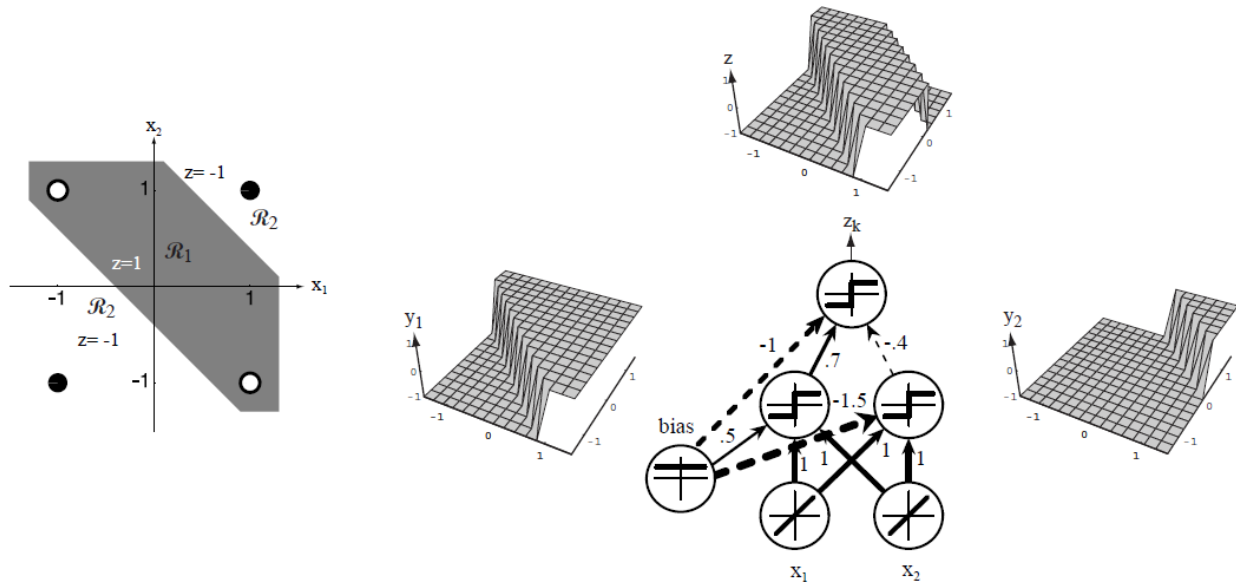# Neural Networks
Homework 2

In this homework, you will develop the network architecture given in the figure to model XOR operation where you have only 4 data. Submit your solution as a *Jupyter Notebook* file.

Figure, Courtesy of the Pattern Classification book by Duda and Hart.

Q1) Solve the XOR problem by hand determined weights for the sigmoid (logistic) and hyperbolic tangent activation functions. Show these solutions as a network graph (as given in figure) and as mathematical functions. These functions will take an input vector x and then calculate the final output including the quantization part, i.e. using the signum and hyperbolic tangent activation functions. Show feed-forward calculations and obtained outputs for the 4 data for the sigmoid and hyperbolic tangent activation functions (60 points).

Q2) For the sigmoid and the hyperbolic tangent activation functions, show the decision surfaces of the nodes in the hidden layer and the output layer as shown in the above figure (40 points).

Note that, sigmoid (logistic) activation function has range between 0 and 1, and hyperbolic tangent (tanh) activation function has range between -1 and 1.