

PROBLEM SOLVING 1

1. If

$$\varphi(v) = \frac{v}{\sqrt{1+v^2}}$$

whose limiting values are -1 and +1. Find $\varphi'(v)$ and $\varphi'(0)$.

2. Implement a binary logic function “OR” using a simple perceptron.

3. Explore the method of steepest descent involving a single weight w by considering the following cost function:

$$E(w) = \frac{1}{2} \sigma^2 - r_{xd} w + \frac{1}{2} r_x w^2$$

where σ^2 , $r_{xd} (> 0)$ and $r_x (> 0)$ are constants.

4. Fig. 1 shows a neural network involving a single hidden neuron and an output neuron (both adopting hard-limiter to be the activation function), for solving the XOR problem. This network may be viewed as an alternative to that considered in Chapter Two. Show that the network of Fig. 1 solves the XOR problem by constructing (a) decision regions, and (b) a truth table for the network.

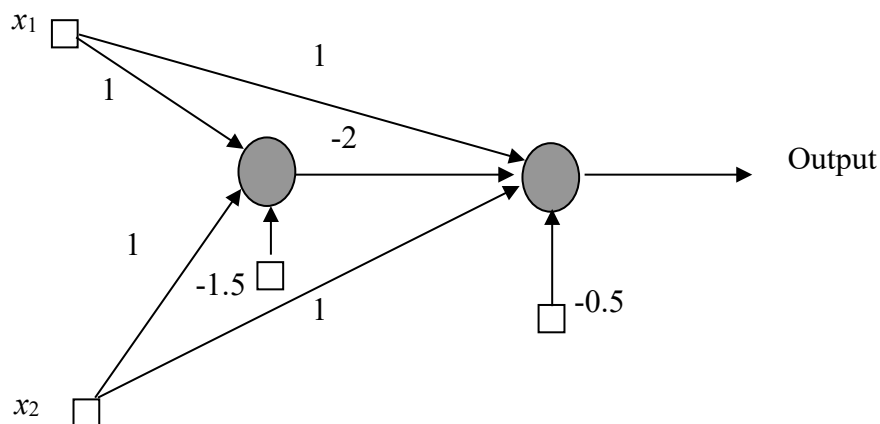


Fig. 1