| LABORATORY NO: 1 | Title: Activation functions used in Neural Networks |
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**Aim :** Write a MATLAB program to generate a few activation functions that are being used in neural networks

**Objective :**

In this experiment we have to study the different types of activation function and have to plot there graphs in MATLAB.

**Theory:**

**Activation Function:**

The activation function is used to calculate the output response of a neuron. The sum of the weighted input signal is applied with an activation to obtain the response. For neuron in same layer some activation functions are used.

There may be linear as well as nonlinear activation function. The nonlinear activation functions are used in a multilayer net. A few linear and non linear activation functions are discussed here:

**1] Identity Function:**

If f is an identity function,

$$y = f(y_{\text{in}}) = y_{\text{in}},$$

the activation (output) of the neuron is exactly the same as the weighted sum of the input into the neuron. As we will see later, identity activation functions are used for neurons in the input layer of an ANN.

**2] Logistic Function:**

This function is given by

$$y = f(y_{\text{in}}) = \frac{1}{1 + e^{-\sigma(y_{\text{in}} - \theta)}},$$

Where $\sigma$ is a positive parameter. This function switches from 0 to 1 in the vicinity of $\theta$ as the argument

goes from $-\infty \text{ to } +\infty$. . The larger the values of $\sigma$ is the more abrupt the change occurs. Unlike the above step functions, the binary Sigmoid function is smooth. In fact it has a derivative which is also smooth. It is easy to see that its derivative is given by

$$f'(y_{\text{in}}) = \sigma f(y_{\text{in}})[1 - f(y_{\text{in}})].$$

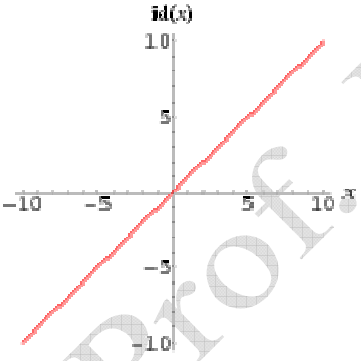
Thus its derivative can be easily computed from the value of the original function itself.

**3] Hyperbolic Tangent Function:**

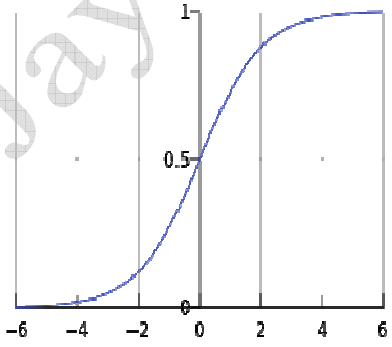
This function is given by-
X= [- 10 : .1 : 10];
Temp = exp (-x );
Y2=(1-temp)./(1+temp);

**EXPECTED OUTPUT / CALCULATION / RESULT:**

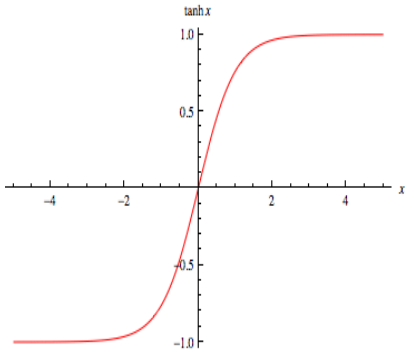
**Graphs in MATLAB**




a. Identity




b. Logistic




c. Hyperbolic Tangent