

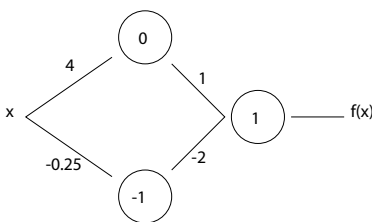
Übung Nr. 1 – 07.04.2022

Aufgabe 1.1: –

Install PyTorch and get it to run.

Aufgabe 1.2: –

Realize this network using PyTorch



Numbers along the edges denote weights and numbers in the circle are bias values. The output layer has no nonlinear activation function, i.e.

$$f(x) = \sigma(4x) - 2\sigma(-0.25x - 1) + 1.$$

Visualize the function represented by the network for Sigmoid activation and for ReLU in the hidden layer.

Aufgabe 1.3: –

We approximate the function

$$f : [-2, 2]^2 \rightarrow \mathbb{R}, \quad f(x, y) = \sin(x^2 + \frac{1}{2}xy^2)$$

using a neural network $f[P](x, y)$. Try to get the error

$$\max_{i,j=0,\dots,N_{test}} |f(x_i, y_j) - f[P](x_i, y_j)|$$

as low as possible using the $(1 + N_{train})^2$ test points

$$(x_i, y_j) = \left(-2 + \frac{4i}{N_{train}}, -2 + \frac{4j}{N_{train}} \right), \quad i, j = 0, \dots, N_{train}$$

1. First try to reach the accuracy in the training points, choosing different values for N_{train} .
2. Select separate (maybe random) testing points and try to reach the accuracy in these. Try to get as good accuracy as possible. You'll have to play around with the number of training and testing points and with the layout of the network.