Home Assignment - 6

Submit soft copy at *https://hello.iitk.ac.in/course/me698asem12324*

Due on or before: 06.11.2023

Develop an artificial neural network (ANN), with one hidden layer, that will approximate the function given below in the interval $[-1,1]$

$$f\left(x_{1},x_{2}\right)=\left(1-x_{1}\right)^{2}+100\left(x_{2}-x_{1}^{2}\right)^{2}$$

Write a computer program (preferably in python), **from scratch**, to compute the necessary weights and biases of the ANN. The computer program must NOT use scikitlearn/scipy/statistics/Tensroflow/Keras/Pytorch or similar packages/libraries. You can only use packages for vector/matrix/array operations and plotting (numpy, matplotlib etc.).

1. Generate 200 training data by randomly selecting x_{1},x_{2} within the interval $[-1,1]$.

2. Train the network and find the weights and biases.

3. Generate 100 test data by randomly selecting x_{1},x_{2} within the interval $[-1,1]$.

4. Calculate the training and test errors (cost functions).

5. Put your code, and the written documents, if any, in a folder; zip the folder and submit in Mookit.