ILLINOIS

IE534/CS547: Deep Learning **(Due: Mar-26-2021)**

Homework #6

Instructor: Richard B. Sowers

Read all the instructions below carefully before you start working on the assignment, and before you make a submission.

- **This is a group homework, every group only submit ONE solution on Compass .** Please include the names of all the group members.
- **Due time is at 11:59pm** at the due date. **No late submission!**
- All students are expected to abide by the Honor Code
- All date-times will be in Champaign-Urbana
- Please put your typed solution in a PDF format. For code, you should submit a google colab notebook link with viewers permission to instructors and TAs in your solution PDF file.

Problem 1. Coding Question (30 points)

Feedforward Networks

Approximate the function

$$f(x) = x^3 - 0.5x^2$$

by a multilayer neural network.

- Explore the dependence on number of layers.
- Explore the dependence on the dimensions of the internal layers.
- Explore the dependence on sigmoids as pposed to ReLU.

This is a bit of an open-ended assignment. Please think and interpret.

Hint: This is called hyperparameter tuning. Please try and find the best model, i.e., either having the smallest loss or converging fastest to the same level loss. The latter is preferred since we can always get a lower loss by training longer.

What to submit:

- You should submit a **PDF file** with a google colab notebook link with viewers permission to instructors and TAs.
- You exploration process and your conclusion.