

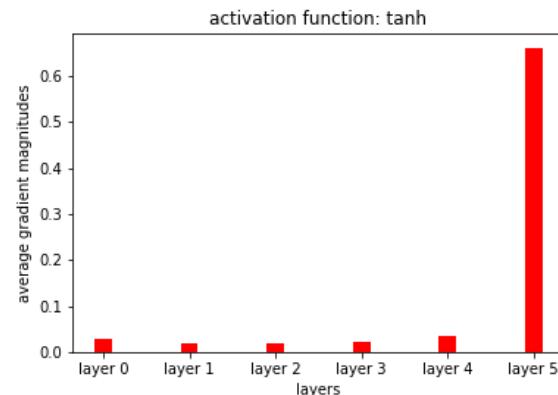
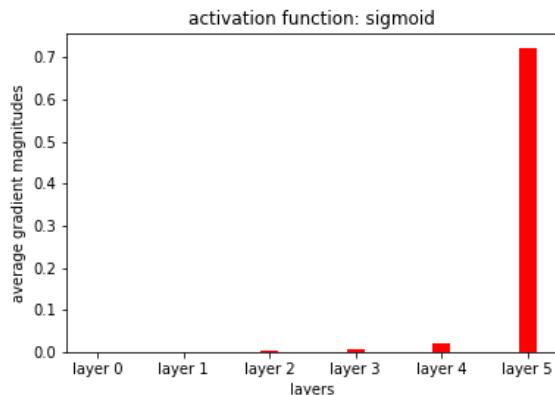
CS-568 Deep Learning - Assignment 1

Backpropagation for MLPs

Fall 2020

Assigned	Thursday, February 11, 2021
Due	Thursday, February 18, 2021 before 11:00 pm

- In this assignment, we will implement the backpropagation algorithm for training an MLPs.
- The main python scripts in this assignment are
 1. **driver_nn.py** creates the object of neural network class that can be further used to call train and test functions.
 2. **neural_network.py** contains train and test functions.
 3. **f_load_dataset.py** generates data from three different functions ($\sin(x) \sin(2x)$, $\sin(x)/x$, $\sin(2\pi x) \sin(x)$).
 4. **f_check_gradient.py** confirms the correctness of the analytical derivatives.
 5. **f_utils.py** consists of activation function and their derivatives.
- **neural_network.py** also contains code to plot average gradient magnitudes that show vanishing gradients problem. We can see the two different plots of gradient magnitudes here.



- You have to add the missing code in these scripts
 - **neural_network.py**
 - **f_check_gradient.py**
 - **f_utils.py**
- The submission **.zip** file should only contain
 - **neural_network.py (20 marks)**
 - **f_check_gradient.py (10 marks)**
 - **f_utils.py (10 marks)**
 - Figures 2 to 6 (**60 marks**)
- Plot the output function in Figure 2, 3 and 4 using your code as illustrated in Figure 1.
- Reproduce Figure 5 and 6 using **generate_results.py** script.

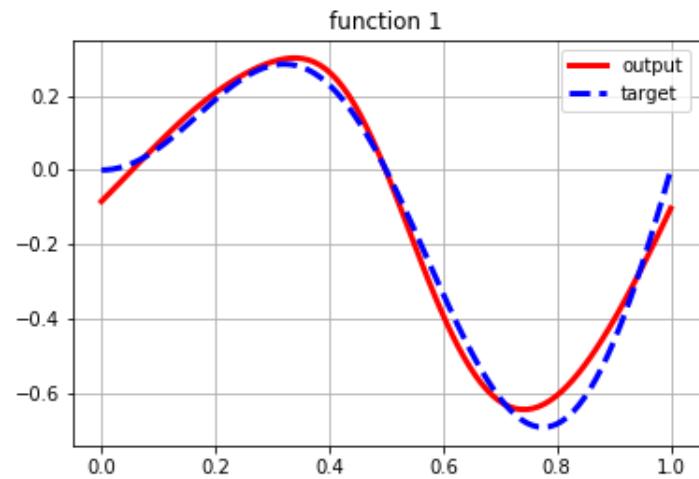


Figure 1: Sinusoidal function output and target plots.

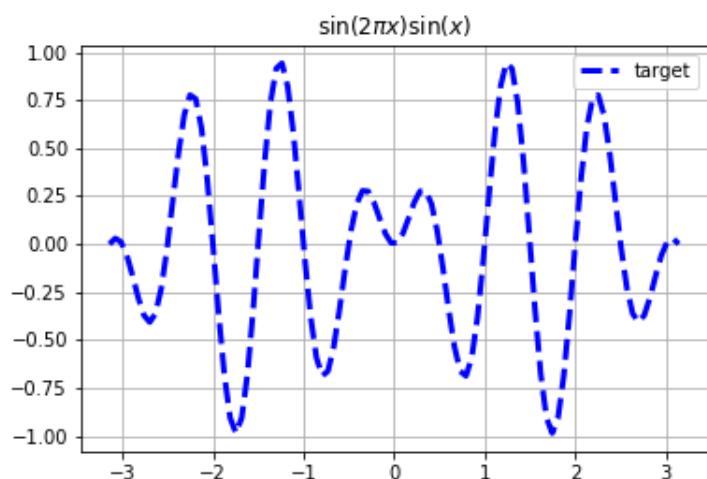


Figure 2: Plot output of this function. **(10 marks)**

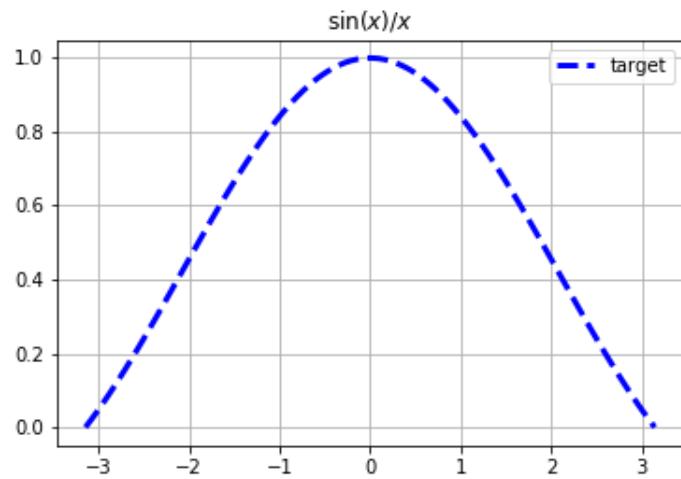


Figure 3: Plot output of this function. **(10 marks)**

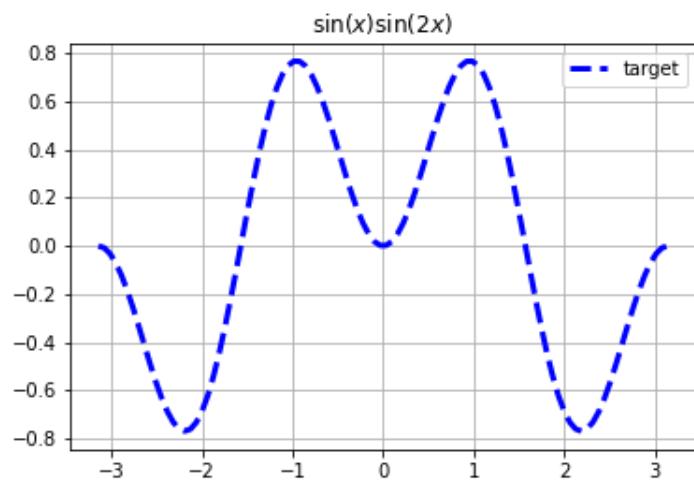


Figure 4: Plot the output of this function. **(10 marks)**

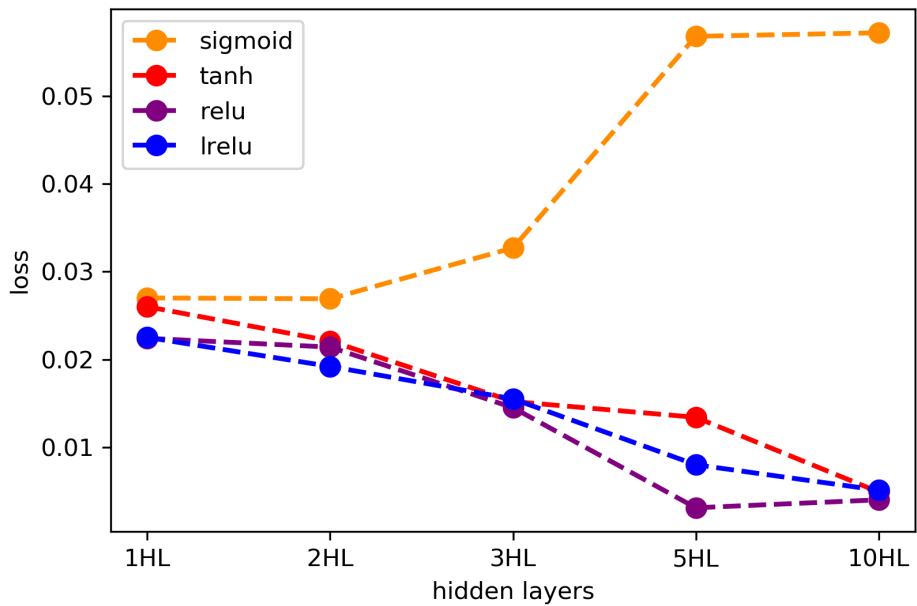


Figure 5: Official image. (20 marks)

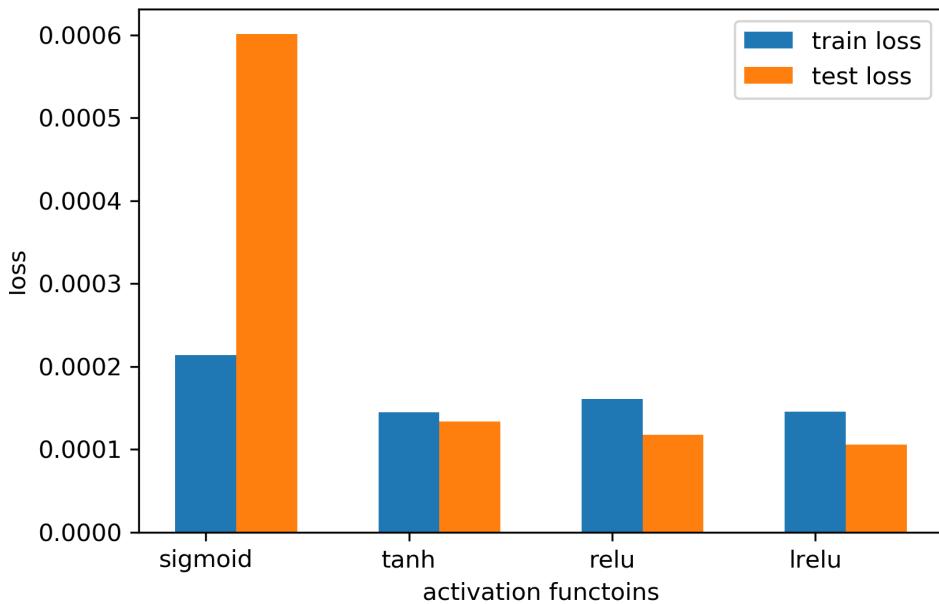


Figure 6: Official image. (10 marks)