CPS485 - 2025 Fall - Assignment #3

DUE DATE: No later than Nov. 4 (Tue.), 2025, 11:59 PM EST.

REQUIREMENTS

- Each group will hand in only **one submission**.
- **Print names of all members** are required in submissions.
- **All code is required to be runnable**.
- **All conclusions need to be rigorously defended.**
- All source code and document for each submission are required to be packed in a **ZIP file**. The name of this ZIP file is suggested to follow the format:
  `CPS485_2025_Fall_[HW NUMBER]_[MEMBER NAMES].zip` .
- All submissions will be sent to Fanchao (fmeng@misericordia.edu) via **emails** or using GitHub repos. Fanchao will confirm each submission. No printed submissions.
- **Late submissions are NOT accepted** unless you have the permission from Fanchao.

Problems (100 points in total)

1. (100 pts) **Automatic differentiation** Please implement the `autodiff` , including both the forward mode and the reverse mode.
2. [BONUS] Define a non-trivial yet small enough feedforward neural network with multiple layers. Train it on a regression task until overfitting. Track the gradient flow of all parameters during the training. Summarize and plot the flow.