Module 7 - Bonus Challenges

§M7: Neural Networks

- Below are open-ended bonus challenges; solving them is not required but can help you better understand ML/AI in the context of engineering, and how to use them in practical cases.
- Bonus points earned in all homework assignments will be averaged (6 bonus points for each assignment) and then directly added to your final score to calculate your final letter grade.

Challenge 1.1. For this bonus question, you will apply a neural network to a 1D regression problem. The training dataset is provided in the file `‘m07_bonus.xls‘` is the training dataset. The first column, labeled `’x’`, represents the input, while the second column, labeled `’y’` represents the output, represents the output. Please complete the task according to the following requirements: (*6pts*)

1. Fit a neural network model to the training dataset using PyTorch.
2. Analyze the characteristics of the data distribution and select activation functions and architectures that you believe will be beneficial. Provide reasons for your choices.
3. Show the training history and the fitted output curves across the range of input values.
4. Submit your Jupyter notebook file with necessary comments.