SoC **Assignment-2** **MLR**

Hello Folks!

Ready for an adventure in the world of Azeroth?

Imagine you are a wildlife surveyor in the city of Azeroth. In Azeroth, the populations of two creatures, leopanet and paldore, are interdependent: the paldore feeds on the leopanet.

Your task is to analyze how the populations of these creatures change over time. You are given a data file with two columns (x1 and x2). The first row represents time 0, and each subsequent row represents time intervals of 0.1.

time	x_1	x_2
0	Value 1	Value 1
0.1	Value 2	Value 2
0.2	.	.
0.3	.	.
...	.	.

From this data, you need to derive a governing ordinary differential equation (ODE) for the population dynamics of each creature, considering linear and non-linear terms up to the second degree.

Hint 1: In usual problems seen so far, we have Xw=y, where w and y are column vectors. In this problem, they may be multiple column matrices.

Hint 2: For estimation of derivatives of given population data, use central difference method.

$$f'(a) = \frac{f(a+t) - f(a-t)}{2t}$$

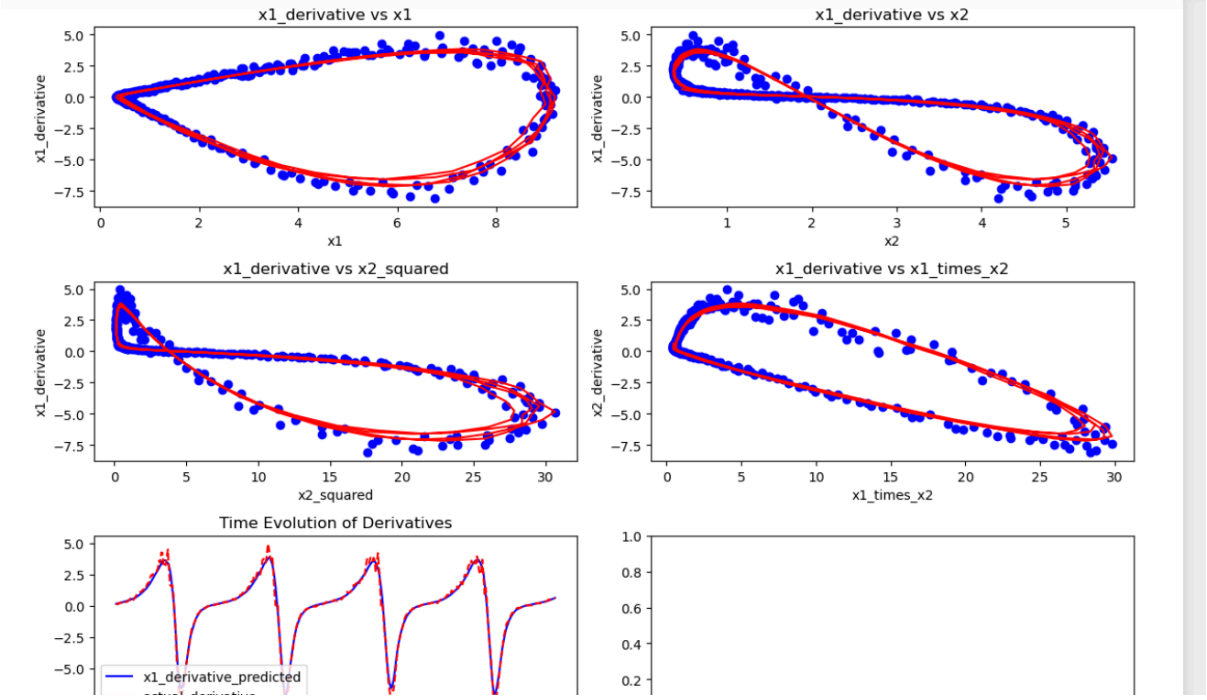
In the provided Jupyter notebook (pynb file):

1. Identify the given data and the objectives.
2. Plot a scatter plot of the given data against time.
3. Understand the hypothesis and the provided pseudocode to solve the problem.
    - Note: As this is your first experience with Multiple Linear Regression (MLR), pseudocode is included.

4. Demonstrate the train-test performance by splitting the data into three different sets to avoid sampling bias.
5. Plot relevant graphs to visually verify the results.

Please avoid using AI-generated code to ensure you fully grasp the concepts and methods.

Sample Expected Plots:



HAPPY LEARNING !