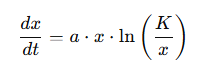
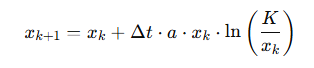
**Using a Python Script in Spyder**:

1. **Explore and Read the Data File**  
   Load the attached dataset file, **"data\_mass\_raw.txt"**, into the script. Store its contents in appropriate NumPy variables.  
   *Hint:* This file contains time-series data (in days) of a mass-related quantity, referred to as x.
2. **Data Analysis**
   * Determine the number of time data points.
   * Display the following in the console:
     + Number of data points.
     + Minimum and maximum values of x.
     + The final time value (ensuring it is less than 500 days).
3. **Data Visualization**  
   Create a well-designed 1D plot to illustrate the data described above.
4. **Model Implementation**  
   Analyze the data using the given model:



 Start with the constants a=0.07 and K=700.

 Numerically solve x(t)x(t)x(t) using the algorithm :



*  Parameters:
  + Time step: Δt=0.05.
  + Initial value: x0​=16.
* Compute x(t) values until the time matches the last point in the dataset.
* Overlay the approximation x(t) on the known data in a graph.

1. **Interpolation**

* With thousands of computed x values, use Scipy to interpolate them onto a less refined grid matching the dataset’s time points.
* Ensure the interpolation creates a smooth curve with second derivative continuity.
* Plot the original data, the computed approximation, and the interpolated curve for comparison.

1. **Solver Fonction**

* Implement a function mon\_solver that automates the numerical solution:
  + Inputs: a, K, x0​, Δt.
  + Outputs: Approximated x values sampled at the dataset’s time points.
* Test the function with the parameters a=0.07, K=700, x0=16, Δt=0.05.
* Plot the original data and the function’s result for verification.