Respected Instructor,

I have done this project in C++ programming language and the results can be calculated in both single and double floating-point precision as defined by IEEE by changing the precistion_type value to float or double in the numerical-project/src/main.cpp file. In order to compile and run the code yourself, you will need the following dependencies.

1. A C++17 compatible compiler
2. Python 3.8 (For plotting)

To plot the points on the graph, you will need to run the python script plot.py.

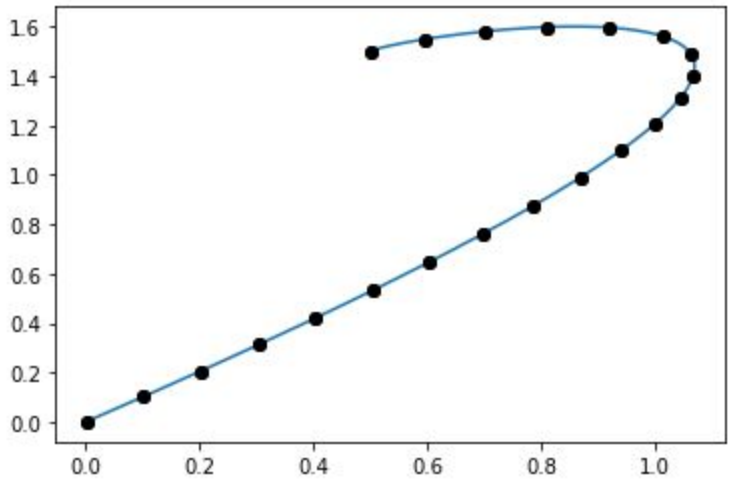
Equation:

Below is the equation for step 1:

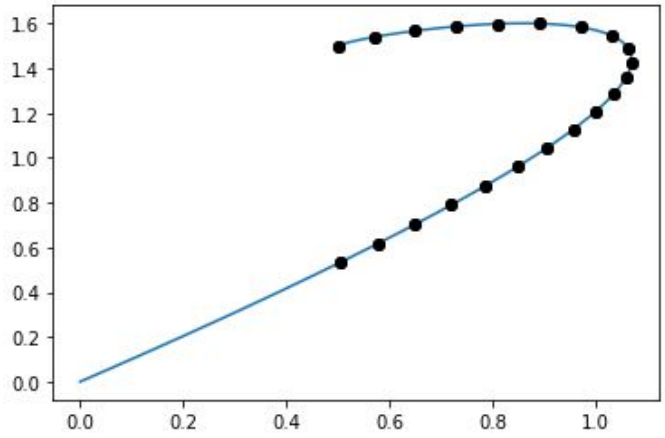
$$t^*(s) = \frac{0.5}{3} t^* [0.424264 + 4* \sqrt{16.52625t^4 - 31.14t^3 + 12.69t^2 + 2.88t + 0.18} + \sqrt{264.42t^4 - 249.12t^3 + 50.76t^2 + 5.76t + 0.18}\ ] - (2.19556*s)$$

Plots:

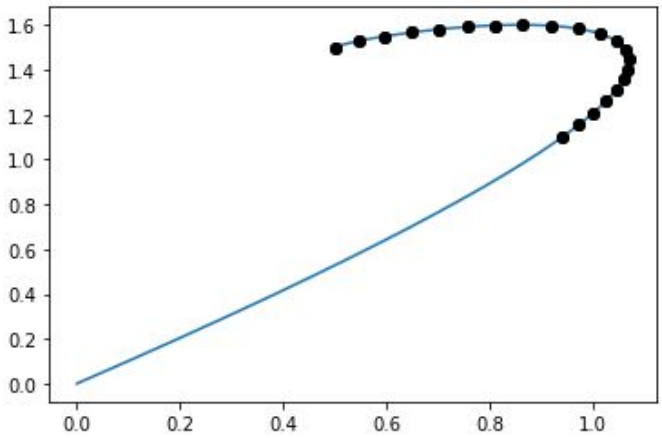
For s = 1.0



For s=0.75



For s = 0.50



For s = 0.25