Technical University of Moldova
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Report

№: 4

MMC

Subject: Interpolations

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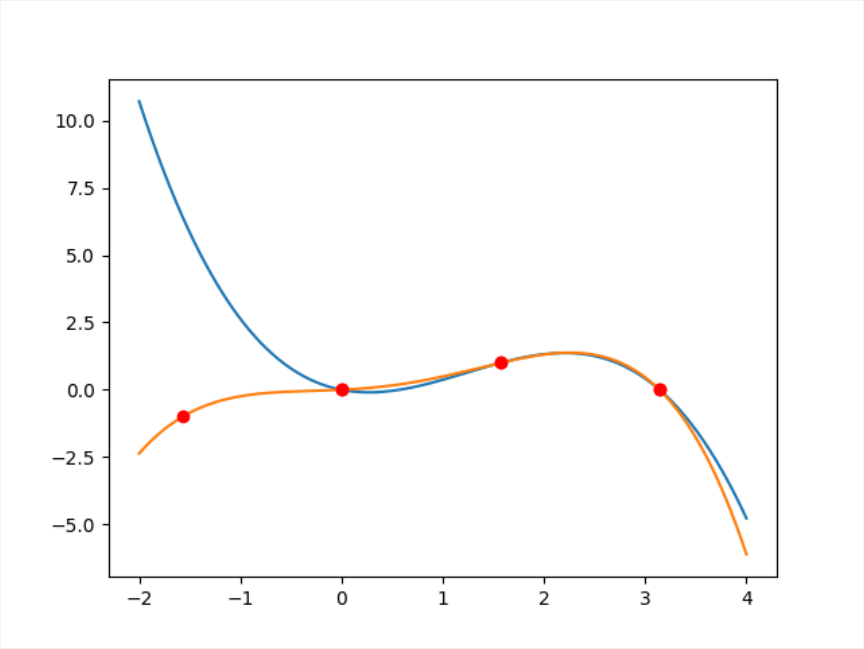
1 Quadratic and Cubic



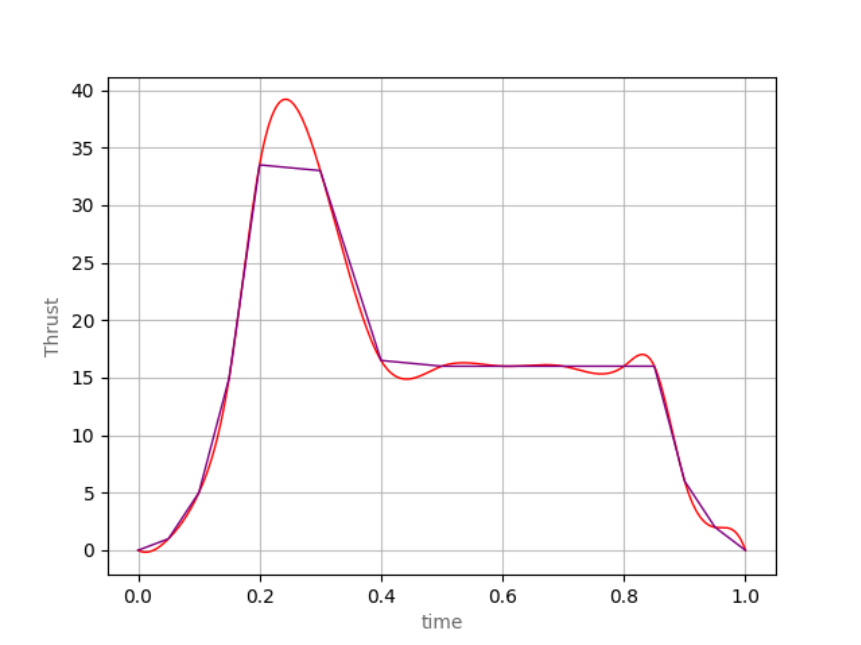
Img 1: Quadratic and Cubic plots

For these problems, **General Divided Difference** method was used.
Given $n+1$ distinct points $x_0, ..., x_n$ with n $\geqslant$ 2, define:

$$f[x_0, ..., x_n] = \frac{f[x_1, ..., x_n] - f[x_0, ..., x_{n-1}]}{x_n - x_0}$$

This is a recursive definition of the n^{th}-order divided difference of $f(x)$, using divided differences of order n.

2 Splines



Img 2: Splines

In this exercise, the same function, as in the previous exercise, was used. From this exercise, it can be seen how convinient are the interpolations: instead of simple lines, we recive a smooth function, which can be used in multiple problems, like finding the area or other stuff.

From the graph, it can be seen the drawback of this method: in the area x = (0.2; 0.3) we have 2 points that are pretty close to each other (y = (33.5, 33)), resulting in a big deviation.

3 Matrices Gauss-Seidel

Last iteration: [8.03469022e+59 -1.60693804e+60]
Solution: [1. 1.]

Result 1: Gauss-Seidel last iteration and actual solution

From the results, it can be seen that Gauss-Seidel method failed to find the solution, therefore the Gauss-Seidel method diverges when the roots are equal to 0.

4 Matrices equation solutions

First system: No solution
Second system: [(0, 0, 0, 1)]

Result 2: The solutions of the given equations