

Laboratory 4

Deadline: 1 – 5 April 2024

Hermite interpolation

1. Let us consider the following table (that contains some data regarding a moving car).

Time	0	3	5	8	13
Distance	0	225	383	623	993
Speed	75	77	80	74	72

- Use the Hermite interpolation polynomial to estimate position and speed of the car when the time is $t = 10$.
2. Let us consider $f(x) = \ln x$ and $f(1) = 0$, $f(2) = 0.6931$, $f'(1) = 1$, $f'(2) = 0.5$.
- Approximate $f(1.5)$ by cubic interpolation.
 - Find the absolute approximation error.
3. Plot (in a single figure) the graphs of the function $f : [-5, 5] \rightarrow \mathbb{R}$ given by $f(x) = \sin(2x)$ and of the corresponding Hermite interpolation polynomial (considering 15 equidistant nodes between -5 and 5).
4. The data from the following table are generated using the function $f(x) = x \ln x$.

x	$f(x)$	$f'(x)$
8.3	17.56492	3.116256
8.6	18.50515	3.151762

- Use the Hermite interpolation polynomial to approximate $f(8.4)$ and find the absolute error.

Remark: 1 (1p), 2-4 (0.5p)