

Lab 6

Cubic spline interpolation

Use Matlab function *spline*.

1. Consider the function: $f(x) = \sin(x)$ defined on $[0, 2\pi]$ and the nodes $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$.
 - (a) display the value of the function, the value of the cubic natural spline and the value of cubic clamped spline function at $x = \frac{\pi}{4}$.
 - (b) plot the graphs of the function, the cubic natural spline and the cubic clamped spline function, in the same figure.
2. There are given 5 arbitrary points, using Matlab function *ginput*. Plot the points and the graph of cubic natural spline function that passes through all the given points.
3. In the following table there are some data regarding a moving car.

Time (in s)	0	3	5	8	13
Distance (in feet)	0	225	383	623	993
Speed (in feet/s)	75	77	80	74	72

Use a clamped cubic spline to predict the position of the car and its speed when the time is $t = 10$ s.