

AMSC/CMSC 460: HW #7
Due: Tuesday 4/3/18 (in class)

Please submit the solution to at least one problem in LaTeX.

1. Determine all the values of a, b, c, d, e for which the following function is a cubic spline

$$f(x) = \begin{cases} a(x-2)^2 + b(x-1)^3, & x \in (-\infty, 1], \\ c(x-2)^2, & x \in [1, 3], \\ d(x-2)^2 + e(x-3)^3, & x \in [3, \infty). \end{cases}$$

Next, determine the values of the parameters so that the cubic spline interpolates this table

x	0	1	4
y	10	7	15

2. Find a natural cubic spline function whose knots are $-1, 0, 2$ and that takes these values

x	-1	0	2
y	10	7	4

3. Use Matlab's built-in *spline* routine to plot a cubic spline function that interpolates the following 11 points:

$$x_i = i/10, \quad y_i = e^{x_i}, \quad i = 0, \dots, 10.$$

If you have access to Matlab's spline toolbox, use the *csape* routine to plot the spline function that interpolates this exponential data with different boundary conditions (try not-a-knot, periodic, etc.). See <https://www.mathworks.com/help/curvefit/csape.html>