ASE 211 Homework 8

Due: 12:00 noon, Friday, March 24.

1. Develop a Matlab code which will construct a cubic spline interpolant. The code should consist of several m-files which do the following:

(i) Input the data (x_i, y_i), $i = 1, \ldots, n$.

(ii) Build the matrix and right hand side.

(iii) Solve the linear system for $S_2, \ldots, S_{n-1}$, and set $S_1 = S_n = 0$.

(iv) Compute the coefficients a_i, b_i, c_i, d_i, $i = 1, \ldots, n-1$.

Test your code on the function from the last assignment,

$$f(x) = \frac{1}{1 + 25x^2}.$$

Interpolate the function at

(a) 5 equally spaced points between -1 and 1,

(b) 11 equally spaced points between -1 and 1,

(c) 21 equally spaced points between -1 and 1.

Plot your solution for each case and compare your answer to the true function.

2. Use your cubic spline code to work problem A8.2.

Hand in all matlab *m*-files and diaries.