Aero 320: Numerical Methods

Lab Assignment 14

Fall 2013

Problem 1

Spline interpolation

(a) Generate a table of datapoints (x_i, y_i), $i = 0, \ldots, 5$, by sampling the function $y = \dfrac{1}{1+25x^2}$. To do this, choose $x_i = -1 : 0.4 : 1$. Then evaluate these x_i exactly at the function to determine y_i.

(b) Set up the matrix-vector equations needed to interpolate these data via linear spline. Repeat the same for quadratic and cubic splines.

(c) Solve the system of linear equations (by hand OR by writing a code) using algorithms you learned in this course (for example, LU decomposition or Gauss elimination).

(d) Plot your spline interpolations together with the datapoints. Compare your results with the MATLAB plots (shown in lab).