assignment3_fall_2022

October 11, 2022

Assignment 3: MATH 425/625 Numerical Analysis

Your Name

Question 1: Fitting natural cubic splines $S_j(x) = a_j + b_j(x - x_j) + c_j(x - x_j)^2 + d_j(x - x_j)^3$.

1. Simulate data from $y = cos(x)$ for x in the interval $[-\pi/2, \pi/2]$. Use equally spaced x values.
2. Set up the tri-diagonal coefficient matrix A for natural cubic splines.
3. Set up the y vector and solve the system $Ac = y$ to obtain the c's. Use scipy linalg to solve the system.
4. Solve for the other coefficients: a's, b's, and d's.
5. Compare the fitted coefficients with values from the scipy builtin cubic splines function for the first three splines.
6. Plot the $cos(x)$ curve and the interpolate the values using a finner grid and your own spline code.