

Homework Assignment for Week 08

1. Section 3.2: Problem 6, 8, 12.

For problem 12. you could use direct evaluation of Lagrangian interpolating polynomials as in last homework, but you are encouraged to implement Neville's method, Algorithm 3.1, page 123.

2. Section 3.5: Problems 12, 13, 14, 30, 34, 35.

Remark: In problem 12: 'clamped' means $S'(1) = f'(1)$, $S'(3) = f'(3)$. In problem 13: 'natural' means $S''(1) = 0$, $S''(3) = 0$.

3. The requirement $S(x)$, $S'(x)$ and $S''(x)$ be continuous at interior nodes x_1, \dots, x_{n-1} can be conveniently referred to as $S \in C^2([a, b])$, or S is a C^2 spline. We showed in class how to count the number of these (continuity) conditions and conclude that 4 unknowns, hence cubic polynomials are required at each interval $[x_j, x_{j+1}]$, and that two additional boundary conditions are required.

Do the same for C^1 splines. Give the degree of the piecewise polynomial and number of additional boundary conditions.