

Engineering Analysis ENG 3420 Fall 2009

Dan C. Marinescu

Office: HEC 439 B

Office hours: Tu-Th 11:00-12:00

Lecture 23

- Attention: The last homework HW5 and the last project are due on Tuesday November 24!!
- Last time:
 - Linear regression versus sample mean. Coefficient of determination
 - Polynomial least squares fit
 - Multiple linear regression
 - General linear squares
 - More on non-linear models
 - Interpolation (Chapter 15)
- Today
 - Lagrange interpolating polynomials
 - Splines
 - Cubic splines
 - Searching and sorting.
- Next Time
 - More on Splines
 - Numerical integration (chapter 17)

Newton interpolating polynomial of degree n-1

- In general, an $(n-1)^{\text{th}}$ Newton interpolating polynomial has all the terms of the $(n-2)^{\text{th}}$ polynomial plus one extra.
- The general formula is:

$$f_{n-1}(x) = b_1 + b_2(x - x_1) + \cdots + b_n(x - x_1)(x - x_2) \cdots (x - x_{n-1})$$

- where

$$b_1 = f(x_1)$$

$$b_2 = f[x_2, x_1]$$

$$b_3 = f[x_3, x_2, x_1]$$

⋮

$$b_n = f[x_n, x_{n-1}, \cdots, x_2, x_1]$$

- and the $f[\dots]$ represent *divided differences*.