MA2501 Numerical methods

Spring 2010

Problem set 5

Exercise 1

The oil production in Norway from 1986 to 2007 measured in millions m^3 is given in Table 1. Construct and plot the polynomial of degree 7 which interpolates all the data-points. Use the polynomial to estimate the production in 2010. What does this say about the future?

År	$10^6 \, Sm^3$
1986	48.771
1989	85.983
1992	123.999
1995	156.776
1998	168.746
2001	180.884
2004	162.777
2007	128.277

Table 1: The oil production in Norway in the period 1986-2007 (source: statistisk sentralbyrå).

Useful Matlab-commands:

`p=polyfit(x,y,n)`

`y=polyval(p,x)`

Hint: If Matlab complains about a badly conditioned problem it may help to change the x-values to be the number of years from 1986, or something similar.

Exercise 2

Find the natural cubic spline that interpolates the points

t	0	1	3	4
y	1	3	2	4

Exercise 3

Problems 9.2.7, 9.2.9 og 9.2.23, p.400-401.

Exercise 4

Use Matlab's `spline` to solve Computer Problem 9.2.6, p.404.