Mathematics 371 – Numerical Analysis
Problem Set 3
October 10, 2001

From the text:

• Section 3.1: 1a,c, 3a,c, 3a, 7a, 10, 17, 25, 29.

However, change the directions for problem 25 as follows: Instead of using the Lagrange form of the interpolating polynomial by hand, use the following Maple commands to do this problem. Begin by loading the `CurveFitting` package with:

```
with(CurveFitting);
```

The command we want in this package is called `PolynomialInterpolation` (note the capitalization – you will need to enter it exactly like this). This function will compute the interpolating of degree $\leq n$ for a list of $n+1$ points. To use it, you can begin by creating a list of the x-values you want, for instance:

```
xlist := [0.2,0.35,0.4,0.55];
```

Then do the same for the y- or $f(x)$-values you want. These should be listed *in the same order* as the x-values.

```
ylist := [12.3,13.3,14.5,17.9];
```

Then the command

```
IP := PolynomialInterpolation(xlist,ylist,x);
```

will compute the interpolating polynomial as a function of the variable x, and assign it to the variable `IP`. You can then perform any other computations you want with this (plotting, differentiating, root-finding, etc.)

Do parts a and b of the problem from the text. Then add the following part:

c) Plot your interpolating polynomials to visualize where the maxima are located. Do you think these interpolating polynomials approximate the true weight curves very well? Explain.

• Section 3.2/1a, 2a, 5a, 7, 14, 17.

Assignment

Individual writeups due Wednesday, October 17.