HOME WORK IV

DUE : FEB/15/2006

The following homework are mostly from Chapter III, section 1 and section 2 in your textbook.

(1) Let $P_3(x)$ be the interpolating polynomial for the data $(0,0),(0.5,y),(1,3)$ and $(2,2)$. Find y if the coefficient of x^3 in $P_3(x)$ is 6.

(2) Let $f(x) = e^x$ for $0 \leq x \leq 2$. Approximate $f(0.25)$ using linear interpolation with $x_0 = 0$ and $x_1 = 0.5$.

(3) For a function f, the forward divided differences are given by

$$\begin{array}{rcllll} x_0 & = & 0.0 & f[x_0] & & \\ & & & & f[x_0,x_1] & \\ x_1 & = & 0.4 & f[x_1] & & f[x_0,x_1,x_2] = \dfrac{50}{7} \\ & & & & f[x_1,x_2] = 10 & \\ x_2 & = & 0.7 & f[x_2] = 6 & & \end{array}$$

Determine the missing entries.

(4) Let $i_0, i_1, \cdots, i_n$ be a rearrangement of the integers $0, 1, \cdots, n$. Show that $f[x_{i_0}, x_{i_1}, \cdots, x_{i_n}] = f[x_0, x_1, \cdots, x_n]$.

(5) Give explict formulas for $f[a], f[a,b], f[a,b,c]$ in terms of $f(a), f(b)$ and $f(c)$.

Try to give an explicit formula for $f[x, x+h, x+2h, \cdots, x+nh]$ (optional : You do not have to do it!).