Assignment 2 : Solution

Note Title 4/30/2012

Q.1

x	$f(x)$		
-1	2		
		-1	
0	1		$3/2$
		2	
1	3		

$$P_2(x) = f(-1) + f[-1,0](x+1) + f[-1,0,1](x+1)x$$

$$= 2 - (x+1) + \frac{3}{2}(x+1)x$$

Q.2

x	$f(x)$			
-2	-1			
		4		
-1	3		-2	
		-2		1
1	-1		3	
		10		
3	19			

$$P_3(x) = f(-2) + f[-2,-1](x+2) + f[-2,-1,1](x+2)(x+1) + f[-2,-1,1,3](x+2)(x+1)(x-1)$$

$$= -1 + 4(x+2) - 2(x+2)(x+1) + (x+2)(x+1)(x-1)$$

Q.3

x	$f(x)$				
0	1				
		4			
1	5		11		
		26		7	
2	31		32	11	1
		90			
3	121		65		
		220			
4	341				

$$p_4(x) = 1 + 4x + 11x(x-1) + 7x(x-1)(x-2) + x(x-1)(x-2)(x-3)$$

$$p_4(5) = 1 + 20 + 55 \times 4 + 7 \times 60 + 120$$

Q.4 $p(x) = a_0 + a_1 x + a_2 x^2$

$p[x_0, x_1, x_2]$: Coefficient of x^2 in the interpolating polynomial p_2 of degree ≤ 2

Since $p_2 = p$,

$\Rightarrow p[x_0, x_1, x_2] = a_2$.

Q.5 $p(x) = a_0 + a_1 x + \cdots + a_m x^m + 0\, x^{m+1} + \cdots + 0\, x^k$

p_k : interpolating polynomial.

$p_k(x) = p(x)$

$p[x_0, x_1, \cdots, x_k]$ = Coefficient of x^k in $p_k(x)$

$= 0$