

Computing the differences is the same as computing the divided differences but we don't have to divide by anything

Ex. Compute the difference table for $f(x) = 2x^3$ for $x_0 = 0, x_1 = 0.5, x_2 = 1, x_3 = 1.5, x_4 = 2, x_5 = 2.5, x_6 = 3$. Next, compute the divided difference table and compare them

Table of differences:

x_i	$f(x_i)$	$\Delta f(x_i)$	$\Delta^2 f(x_i)$	$\Delta^3 f(x_i)$	$\Delta^4 f(x_i)$	$\Delta^5 f(x_i)$
0	0					
0.5	0.25	0.25				
1	2.00	1.75	1.50			
1.5	6.75	4.75	3.00	1.50		
2	16.00	9.25	4.50	1.50	0.00	
2.5	31.25	15.25	6.00	1.50	0.00	
3	54.00	22.75	7.50	1.50	0.00	

Table of divided differences

x_i	$f(x_i)$	I DD	II DD	III DD	IV DD
0	0				
0.5	0.25	0.5			
1	2.00	3.5	3		
1.5	6.75	9.5	6	2	
2	16.00	18.5	9	2	0
2.5	31.25	30.5	12	2	0
3	54.00	45.5	15	2	0