Salahaddin University-Erbil
College of Science-Department of Mathematics

Question Bank about

Numerical Analysis

3rd Year Second Semester

2023-2024

Lecturer: Dr. Jabar S. Hassan

Question 1: Prove that $\Delta (f (x) + g (x)) = \Delta f (x) + \Delta g (x)$ that is Δ is distributive.

Question 2: If c is a constant then prove that $\Delta c f (x) = c \Delta f (x)$.

Question 3: Find f(12) from the following date by using backward difference

x	F(x)
1	1
10	4
15	7
20	10
25	12

Question 4: Use the Lagrange interpolation polynomial to find the value of y at x = 2 for the given set of points (1, 2),(3, 4)

Question 5: Find the value of y at x = 1 for the given set of points (1, 6), (3, 4), (2, 5) use Lagrange interpolation.

Question 6: Fit the straight line to the following data by using least square method

x	1	2	3	4	5
Y	1	2	3	4	5

a) y=x

b) y=x+1

c) y=2x

d) y=2x+1

Question 7: Fit the straight line curve to the following data.

x	75	80	83	90	94	98	100	102
y	30	34	67	46	28	87	23	54

a) y = 0.9288x + 7.78155

b) y = 7.78155x + 0.9288

c) y = 0.8288x + 6.78155

d) y = 6.78155x + 0.8288

and

a) $y = -0.2673x^2 + 3.5232x - 0.9286$

b) $y = 0.2673x^2 + 3.5232x - 0.9286$

c) $y = 0.2673x^2 + 3.5232x + 0.9286$

d) $y = -0.2673x^2 + 3.5232x + 0.9286$

Question 8: What constant c makes the expression $\sum_{k=0}^{n} |f(x_k) - c\, e^{x_k}|^2$ as small as possible?

Question 9: A physics process can be described with the equation $y = f(x) = \frac{a_0}{x} + \frac{a_1}{x^2}$. The measured value of (x, y) are listed in the following table:

x	1	2	3	4
y	3	0.9	0.6	0.4

Use direct nonlinear regression method to determine a_0 and a_1.

Question 10: Use least squares regression to fit a straight line to the data given. Along with the slope and intercept, compute the standard error of the estimate and the coefficient of determinant.

x	0	2	4	6	9	11
Y	5	6	7	6	9	8