Assignment II

1. Write down the similarities and differences between interpolation and regression.
2. What do you mean by interpolation and approximation? Use Lagrange’s interpolation to estimate the value of f(0.6) from the following table of values.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | 0.4 | 0.5 | 0.7 | 0.8 |
| f(x) | -0.916 | -0.693 | -0.357 | -0.223 |

1. By using Newton’s divided difference method, find the value of f(8) from the following table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 4 | 5 | 7 | 10 | 11 | 13 |
| f(x) | 48 | 100 | 294 | 900 | 1210 | 2028 |

1. Construct an interpolation polynomial from the given data using forward difference table and estimate the functional value at x = 3.6.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 |
| f(x) | 1.43 | 1.03 | 0.76 | 0.6 | 0.48 | 0.39 |

1. From the given data set, estimate the functional value corresponding to x=1.7 using backward difference table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | 0 | 5 | 10 | 15 | 20 |
| f(x) | 1.0 | 1.6 | 3.8 | 8.2 | 15.4 |

1. Estimate f(3) from the following data using the cubic spline interpolation method.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | 1 | 2.5 | 4 | 5.7 |
| f(x) | -2.0 | 4.2 | 14.4 | 31.2 |

1. What is regression analysis? Write one advantage and one disadvantage of using regression over interpolation. Also discuss the types of regression.
2. Find the least square line that fits the following data.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 | 5 | 6 |
| f(x) | 5.04 | 8.12 | 10.64 | 13.18 | 16.20 | 20.04 |

1. the best fitting quadratic polynomial from the following data using least square approximation.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | -2 | -1.2 | 0 | 1 | 1.2 | 2.5 | 3 | 4.5 | 6.3 |
| f(x) | 10.39 | 2.96 | -2 | -2.63 | -2.46 | 0.83 | 3.1 | 12.8 | 30.4 |