**Curve Fitting**

|  |  |
| --- | --- |
| **01** | Explain about curve fitting. |
|  | Let (be a given set of n pairs of values, x being independent variable and y the dependent variable. In curve fitting the general problem is to find, if possible, an analytic expression of the form. It is also used to estimate the values of one variables corresponding to the specified values of the other variable. |
|  |  |
|  | **Derive the equations for the method of Least Squares.** |
|  |  |
|  |  |
| **02** | **Fit the straight line to the following data regarding x as the independent variable:** |
|  | : 0 1 2 3 4  : 1 1.8 3.3 4.5 6.3 |
|  | **Solution:**  Let the straight line to be fitted to the given data be y = bx+a. Then the normal equations are     |  |  |  |  | | --- | --- | --- | --- | | x | y | xy | X2 | | 0 | 1 | 0 | 0 | | 1 | 1.8 | 1.8 | 1 | | 2 | 3.3 | 6.6 | 4 | | 3 | 4.5 | 13.5 | 9 | | 4 | 6.3 | 25.2 | 16 | |  |  |  |  |   Substituting the values from the above table in the normal equation, we have  16.9 = 5a + 10b  47.1 = 10a + 30b  Solving the above equation we get a = 0.72, b = 1.33  Hence, The fitted line is y = 0.72+1.33x |
|  |  |
| **03** | **Fit a second degree parabola to the following data** |
|  | : 0 1 2 3 4  : 1 5 10 22 38 |
|  | **Solution:**  Let the parabola to be fitted to the given data be**.** Then the normal equations are as follows:             |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | y |  |  |  |  |  | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | 1 | 5 | 1 | 1 | 1 | 5 | 5 | | 2 | 10 | 4 | 8 | 16 | 20 | 40 | | 3 | 22 | 9 | 27 | 81 | 66 | 198 | | 4 | 38 | 16 | 64 | 256 | 152 | 608 | |  |  |  |  |  |  |  |     Substituting the values in the normal equations, We get    Solving the equations simultaneously, We get  Hence the fitted parabola is |
| **04** | **Find the line of fit to the following data:** |
| **05** | **Fit a second degree parabola to the following data taking x as the independent variable.** |
|  |  |
|  |  |
|  |  |