**LAGRANGE INTERPOLATION**

1. Use a Lagrange interpolating polynomial of the first and second order to evaluate ***f(2)*** on the basis of the data given below. Plot given and obtained data:

*x*0 = 1 *f(x*0*)* = 0

*x*1 = 4 *f(x*1*)* = 1*.*386294

*x*2 = 6 *f(x*2*)* = 1*.*791760

1. Assume that we have developed instrumentation to measure the velocity of the parachutist. The measured data obtained for a particular test case is

|  |  |
| --- | --- |
| **Time, s** | **Measured Velocity *v*, cm/s** |
| 1 | 800 |
| 3 | 2310 |
| 5 | 3090 |
| 7 | 3940 |
| 13 | 4755 |

Estimate the velocity of the parachutist at ***t* = 10 s** using Lagrange interpolation

1. For the data shown below, determine the value of ***x***that corresponded to *f* (*x*)= 0.3.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***x*** | *1* | *2* | *3* | *4* | *5* | *6* | *7* |
| ***f(x)*** | *1* | *0.5* | *0.3333* | *0.25* | *0.2* | *0.1667* | *0.1429* |

1. Employ inverse interpolation to determine the value of ***x***that corresponds to *f* (*x*)=0.85 for the following tabulated data:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***x*** | *0* | *1* | *2* | *3* | *4* | *5* |
| ***f(x)*** | *0* | *0.5* | *0.8* | *0.9* | *0.941176* | *0.961538* |