2)**Simpson's** **Rule** :-

Consider the following equation

Which is called Simpson's Rule .

If we apply this to a succession of pairs of sub-interval to evaluate we get

**Ex:-**

find by using Simpson's rule , h= 0.05

**sol :-**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | 1.00 | 1.05 | 1.10 | 1.15 | 1.20 | 1.25 | 1.30 |
| y | 1.00000 | 1.02470 | 1.04881 | 1.07238 | 1.09544 | 1.11803 | 1.14017 |

)

*n=1*

3) **Gauss – Legendre methods** :-

The Legendre polynomial by the following relation

Where :- , , so

From (1) we can find

- 2x)

-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-\_-

**Two – Terms Gaussian Formula :-**

To find we use the relation

=

Where , , , are unknown

The values of and are : = =

And the values of and are the roots of second degree Legendre polynomial which can be obtain from solving the following equation :-

… (5)

Note : Equation (3) means :

If n=1

If n=2

Where :-

Ex :- find by using Gauss- Legendre method

Where = = ,

So ,

Note :-

1. In this method must be explicitly known
2. The values of , are found when the integration is by (-1, 1) i.e. .