

HASMUKH GOSWAMI COLLEGE OF ENGINEERING, VAHELAL

APPLIED MATHEMATICS FOR ELECTRICAL ENGINEERING (3130908)

TUTORIAL 3: NUMERICAL INTEGRATION

- Evaluate $\int_0^3 \frac{dx}{1+x}$ with n=6 by using Simpson's $\frac{3}{8}$ rule and hence calculate $\ln 2$.
- State Trapezoidal Rule and Simpson's $\frac{1}{3}$ rule with n=10 and hence evaluate $\int_0^1 e^{-x^2} dx$ by using both methods.
- Evaluate $\int_0^{1.2} \ln(1+x^2) dx$ using Trapezoidal rule, Simpson's $\frac{1}{3}$ rule and Simpson's $\frac{3}{8}$ rule. Taking h=0.2 for all cases.
- Evaluate $\int_0^1 e^{-x^2} dx$ by the Gauss integration formula with n=3.
- Using Gaussian two-point formula compute $\int_{-2}^2 e^{-x/2} dx$.

6. The speed, v meters per second, of a car, t seconds after it starts, is show in the following table.

t	0	12	24	36	48	60	72	84	96	108	120
v	0	3.60	10.08	18.90	21.60	18.54	10.26	4.50	4.5	5.4	9.0

Using Simpson's $\frac{1}{3}$ rule, find the distance travelled by the car in 2 minutes.

7. Using Simpson's $\frac{1}{3}$ rule find $\int_0^6 f(x) dx$ from the following table, take h=1

x	0	1	2	3	4	5	6
F(x)	1	0.5	0.3333	0.25	0.2	0.1666	0.1428

8. Using Simpson's $\frac{1}{3}$ rule find $\int_1^{2.5} f(x) dx$ from the following table, take h=0.3

x	1	1.3	1.6	1.9	2.2	2.5
F(x)	1	1.69	2.56	3.61	4.84	6.25

9. Consider the following tabular values

X	25.0	25.1	25.2	25.3	25.4	25.5	25.6
F(x)	3.205	3.217	3.232	3.245	3.256	3.268	3.280

Determine the area bounded by the curve and x-axis between x=25 to x=25.6 by Trapezoidal rule.

10. Using Simpson's $\frac{1}{3}$ rule and Weddle's rule, find $\int_{10}^{16} f(x) dx$ from the following table

X	10	11	12	13	14	15	16
F(x)	1.02	0.94	0.89	0.79	0.71	0.62	0.55

11. A river is 80 meter wide the depth 'd' in meters at a distance X meters from one bank is given by the following table calculate the area of cross section of the river using Simpson's $\frac{1}{3}$ rule.

X	0	10	20	30	40	50	60	70	80
d	0	4	7	9	12	15	14	8	3