Q1.

INPUT FILE

math.exp(-x)

0 1

0.01

2

math.exp(-x)

0 1

0.01

1

OUTPUT FILE

ROMBERG

Integral Value: 0.6321208750083235

No. of Intervals: 4

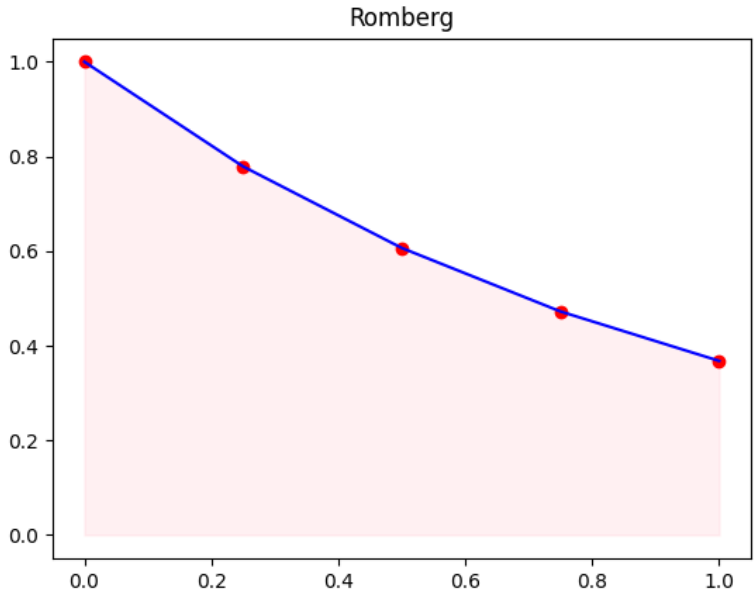
Relative Error: 0.0021040773583884684

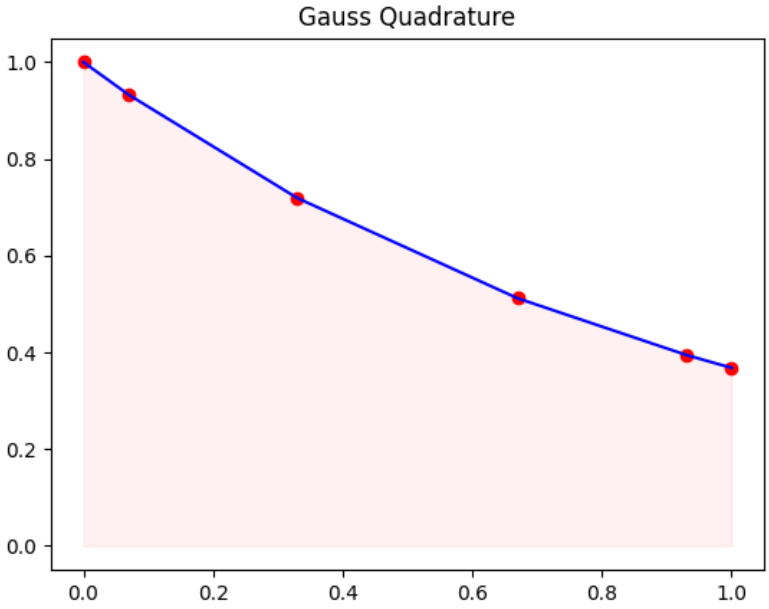
GAUSS QUADRATURE

Integral Value: 0.6321205584853382

No. of Gauss points: 4

Relative Error: -4.790561963657913e-05


Romberg
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0


Gauss Quadrature
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

Q2.

INPUT FILE

-pow(y,2)*t

0 1

1

0.1

1

-pow(y,2)*t

0 1

1

0.1

2

-pow(y,2)*t

0 1

1

0.1

3

OUTPUT FILE

Euler Forward

t	y
0.0	1.0
0.1	1.0
0.2	0.99
0.3	0.970398
0.4	0.94214783164788
0.5	0.9066421301807279
0.6	0.8655421325697955
0.7	0.8205923415745874

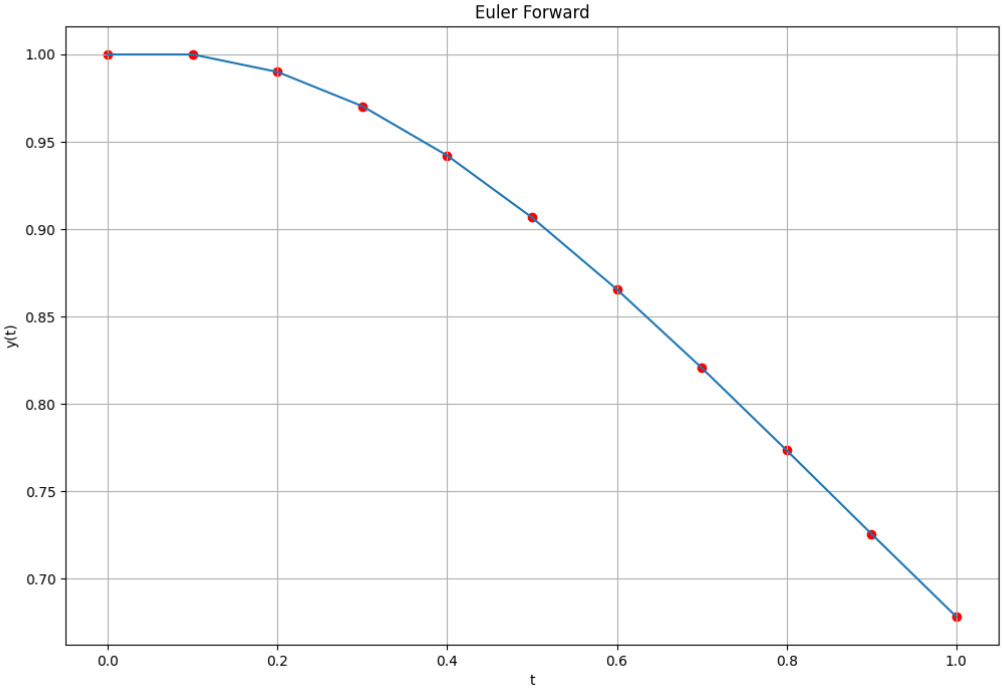
0.8	0.7734563162010268
0.9	0.7255975423553258
1.0	0.6782132809428378

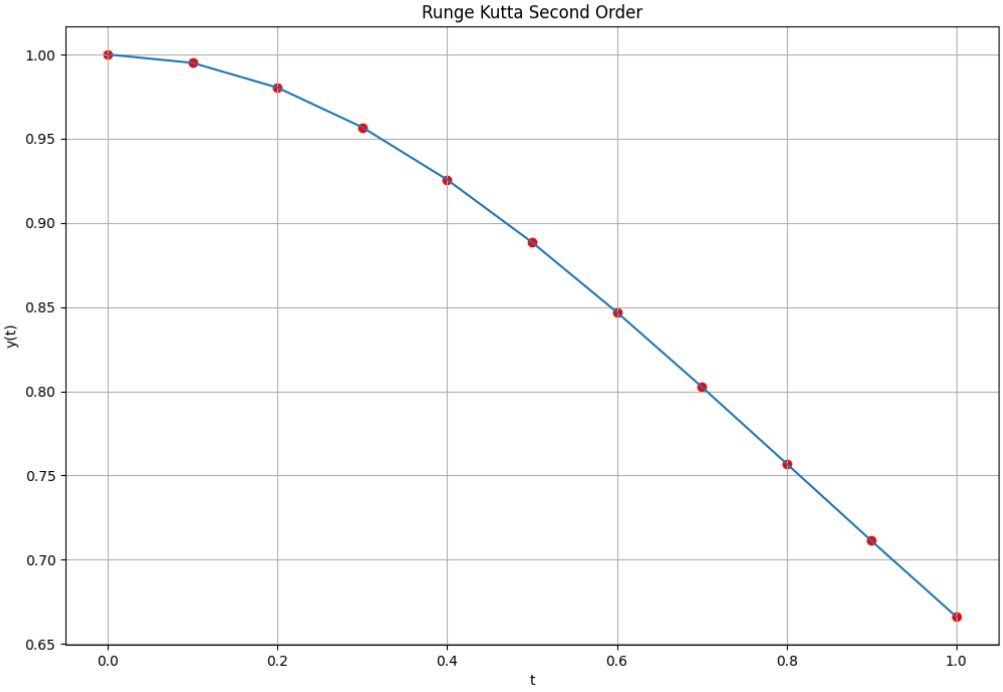
Runge Kutta Second Order

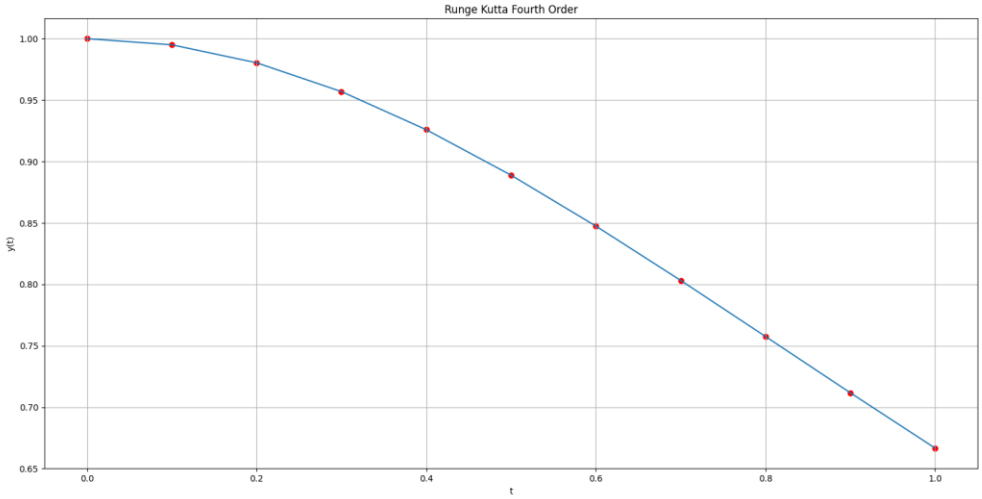
t	y
0.0	1.0
0.1	0.995
0.2	0.9802970186751873
0.3	0.9567411778522137
0.4	0.9256167451456878
0.5	0.888476513240012
0.6	0.846967340653507
0.7	0.8026787908494569
0.8	0.7570337519041632
0.9	0.7112257965444887
1.0	0.6661975858309901

Runge Kutta Fourth Order

t	y
0.0	1.0
0.1	0.9950248651026068
0.2	0.9803921161009694
0.3	0.9569377150604986
0.4	0.9259257966013531
0.5	0.8888887236836223
0.6	0.8474574443936582
0.7	0.8032126736506878
0.8	0.7575756064040682
0.9	0.711743664631487
1.0	0.6666666130890393


Euler Forward
1.00
0.95
0.90
0.85
0.80
0.75
0.70
y(t)
0.0
0.2
0.4
0.6
0.8
1.0
t


Runge Kutta Second Order
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
y(t)
0.0
0.2
0.4
0.6
0.8
1.0
t


Runge Kutta Fourth Order
y(t)
t
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.0
0.2
0.4
0.6
0.8
1.0