Department of Mathematics
Babu Banarasi Das National Institute of Technology & Management, Lucknow

RAS 301 Engineering Mathematics III: B. Tech. (Third Semester) – 2018-19

Assignement-2 (Unit-4) Numerical Techniques-II

1 Solve the equations, by Gauss –Seidel method and Guass Jacobi method also find the $3x + y + z = 1, x + 3y - z = 11, x - 2y + 4z = 21$.

2 Solve by Crout's method $x_1 + x_2 + x_3 = 1, 3x_1 + x_2 - 3x_3 = 5, x_1 - 2x_2 - 5x_3 = 10$.

3. From the following table, find first and second derivative at x = 1.5

x	1.5	2	2.5	3	3.5	4
f(x)	3.375	7.0	13.625	24	38.875	59.0

4. A rod is rotating in a plane. The following table given the angle θ (in radian) through which the rod has turned for various values of time *t* (in *seconds*) .
Calculate the angular velocity and angular acceleration of the rod at *t* = 0.6 seconds:

t	0	0.2	0.4	0.6	0.8	1.0	1.2
θ	0	0.12	0.49	1.12	2.02	3.20	4.67

5. Evaluate (i) $\int_0^{\frac{\pi}{2}} \sin x dx$ by Trapezoidal Rules

(ii) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by (a) Simpson's1/3 rule (b) Simpson's 3/8 rule.

6. Find the value of *y* for *x* = 0.1 by Picard's method, given that $\frac{dy}{dx} = 1 + xy$, y (0) = 1 .

7. Apply Euler's Modified method to solve $\frac{dy}{dx} = x + 3y$ subject to y (0) =1 and hence find an approximate value of y when x=1.

9. Using Euler's method, find an approximate value of y corresponding to x=1.4 given $\frac{dy}{dx} = xy^{\frac{1}{2}}$ and y=1 when x=1.

10. Using Runge-Kutta method of fourth order to solve $\frac{dy}{dx} = x + y^2$ with y (0) = 1 for x = 0.2.

11. Using Runge Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{x^2-y^2}{x^2+y^2}$ with y (0) = 1 at x =0.2 and x = 0.4.

12. Using Runge Kutta method of fourth order, solve $\frac{dy}{dx} = x - y$ with y (1) = 1 find y for x = 1.1,