

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD  
M.Tech I - Semester Examinations, April/May -2012  
COMPUTER ORIENTED NUMERICAL METHODS  
(STRUCTURAL ENGINEERING)

Time: 3hours

Max. Marks: 60

Answer any five questions  
All questions carry equal marks

1. Solve the following system by Gauss- Jacobi and Gauss – Seidel method:  
 $10x - 5y - 2z = 3;$   
 $4x - 10y + 3z = -3;$   
 $x + 6y + 10z = -3.$

2.a) Apply Gauss-Jordan method to find the solution of the following system:  
 $10x + y + z = 12;$   
 $2x + 10y + z = 13;$   
 $x + y + 5z = 7.$

b) Reduce the matrix to the tridiagonal form by Householder's method

$$\begin{bmatrix} 1 & 3 & 4 \\ 3 & 1 & 2 \\ 4 & 1 & 2 \end{bmatrix}$$

3. Fit the quadratic splines with  $M(0)=f''(0)=0$ . Hence find an estimate of  $f(2.5)$  data as given below.  
x      0      1      2      3  
f(x)   1      2      33      244

4. Solve the following by means of Euler method  
 $y' = x + y, y(0) = 1.0$ . Find  $y(0.1), y(0.5)$ .

5. The following table of values are given for a function  $f(x,y)$

y/x	0.1	0.2	0.3
0.1	2.0200	2.0351	2.0403
0.2	2.0351	2.0801	2.1153
0.3	2.0403	2.1153	2.1803

- a) Estimate the values of  $\delta f / \delta x$  at (0.2, 0.1) and  $\delta f / \delta y$  at (0.2, 0.2) by first order and second order formulas.
- b) Estimate the values of  $(\delta^2 f / \delta x \delta y)$  at (0.2, 0.2) using second order formula.

6.a) Explain Richardson's extrapolation method.  
b) What is beam deflection? Explain.

7.a) Describe how the definition of double integral can be used to find approximations of double integrals over coordinate rectangles.  
b) Explain how Simpson's Rule solves double integrals.

8. Find out the undetermined coefficients a, b and c such that the formula is exact for polynomials as higher order as possible and determine the order of truncation error

$$\int_0^h f(x) dx = h \left\{ a f(0) + b f\left(\frac{h}{3}\right) + c f(h) \right\}$$

# Computer Oriented Numerical Methods

**Benjamin Bryan**



## **Computer Oriented Numerical Methods:**

## Whispering the Secrets of Language: An Psychological Quest through **Computer Oriented Numerical Methods**

In a digitally-driven earth where displays reign supreme and instant communication drowns out the subtleties of language, the profound secrets and psychological nuances concealed within phrases usually go unheard. Yet, located within the pages of **Computer Oriented Numerical Methods** a interesting fictional treasure pulsing with natural feelings, lies an exceptional quest waiting to be undertaken. Published by an experienced wordsmith, that marvelous opus invites visitors on an introspective trip, softly unraveling the veiled truths and profound influence resonating within the fabric of each and every word. Within the mental depths with this poignant review, we shall embark upon a genuine exploration of the book is core themes, dissect its interesting writing type, and succumb to the powerful resonance it evokes strong within the recesses of readers hearts.

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