

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

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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

**Shan Sun Kuo**



## **Computer Oriented Numerical Methods:**

**Computer Oriented Numerical Methods** N Datta,2004 This book clearly presents the algorithms required for easy implementation of numerical methods in computer programming The book deals with the important topics of numerical methods including errors in numerical computation in a lucid style Chapter end short questions with answers and appendices with theory questions and C programs are student friendly feature of the book *COMPUTER-ORIENTED NUMERICAL METHODS* P. THANGARAJ,2008-07-22 Numerical methods are powerful problem solving tools Techniques of these methods are capable of handling large systems of equations nonlinearities and complicated geometries in engineering practice which are impossible to be solved analytically Numerical methods can solve the real world problem using the C program given in this book This well written text explores the basic concepts of numerical methods and gives computational algorithms flow charts and programs for solving nonlinear algebraic equations linear equations curve fitting integration differentiation and differential equations The book is intended for students of B E and B Tech as well as for students of B Sc Mathematics and Physics **KEY FEATURES** Gives clear and precise exposition of modern numerical methods Provides mathematical derivation for each method to build the student s understanding of numerical analysis Presents C programs for each method to help students to implement the method in a programming language Includes several solved examples to illustrate the concepts Contains exercises with answers for practice **COMPUTER ORIENTED NUMERICAL METHODS** ,1996

Computer-oriented Mathematics Ladis D. Kovach,1969 Computer Oriented Numerical Methods Vaidyeswaran Rajaraman,1980 **Fundamentals of Numerical Computation (Computer-Oriented Numerical Analysis)** G. Alefeld,R. Grigorieff,2012-12-06 **Computer Oriented Numerical Methods, 1E** Benjamin Bryan,2014-11-01 Numerical Analysis is a way to solve the real life mathematical physical and engineering problems Numerical Analysis can be used to answer the problems for which the analytical solution is not available Computer Oriented Numerical Methods Lance Diaz,2014-11-01 Numerical Analysis is a way to solve the real life mathematical physical and engineering problems Numerical Analysis can be used to answer the problems for which the analytical solution is not available **COMPUTER ORIENTED NUMERICAL METHODS, FOURTH EDITION** RAJARAMAN, V.,2018-11-01 This book is a concise and lucid introduction to computer oriented numerical methods with well chosen graphical illustrations that give an insight into the mechanism of various methods The book develops computational algorithms for solving non linear algebraic equation sets of linear equations curve fitting integration differentiation and solving ordinary differential equations **OUTSTANDING FEATURES** Elementary presentation of numerical methods using computers for solving a variety of problems for students who have only basic level knowledge of mathematics Geometrical illustrations used to explain how numerical algorithms are evolved Emphasis on implementation of numerical algorithm on computers Detailed discussion of IEEE standard for representing floating point numbers Algorithms derived and presented using a simple English based structured language Truncation and rounding

errors in numerical calculations explained Each chapter starts with learning goals and all methods illustrated with numerical examples Appendix gives pointers to open source libraries for numerical computation

**COMPUTER ORIENTED NUMERICAL METHODS, FOURTH EDITION** RAJARAMAN, V.,2018-11-01 This book is a concise and lucid introduction to computer oriented numerical methods with well chosen graphical illustrations that give an insight into the mechanism of various methods The book develops computational algorithms for solving non linear algebraic equation sets of linear equations curve fitting integration differentiation and solving ordinary differential equations

**OUTSTANDING FEATURES**

Elementary presentation of numerical methods using computers for solving a variety of problems for students who have only basic level knowledge of mathematics Geometrical illustrations used to explain how numerical algorithms are evolved Emphasis on implementation of numerical algorithm on computers Detailed discussion of IEEE standard for representing floating point numbers Algorithms derived and presented using a simple English based structured language Truncation and rounding errors in numerical calculations explained Each chapter starts with learning goals and all methods illustrated with numerical examples Appendix gives pointers to open source libraries for numerical computation

*Computer Based Numerical and Statistical Techniques* Santosh Kumar Sengar, Computer Based Numerical and Statistical Techniques has been written to provide fundamental introduction of numerical analysis for the students who take a course on Engineering Mathematics and for the students of computer science engineering The book has been divided into 14 chapters covering all important aspects starting from high speed computation to Interpolation and Curve Fitting to Numerical Integration and Differentiation and finally focusing on Test of Significance

Computer Oriented Numerical Methods in Technology Allen B Larochele,Allen B Allenblarochele,2014-11-01 Numerical Analysis is a way to solve the real life mathematical physical and engineering problems Numerical Analysis can be used to answer the problems for which the analytical solution is not available

*Computer-oriented Numerical Methods* Roman Trobec,2005

**COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS** MISHRA, SANT SHARAN,2013-05-22 This comprehensive text provides a thorough understanding of mathematical concepts and their applications with special emphasis on computational algorithms The book gives a detailed discussion on all the relevant topics of both numerical and statistical methods which are nowadays very important at computing level It also includes the basic issues related to theory of estimation and testing of hypothesis various sampling tests and analysis of variance with plenty of illustrations The topics covered in this book are supported by a large number of worked out examples C programs and algorithms to facilitate clear understanding of various theories discussed on numerical and statistical methods The text is intended for the undergraduate students of computer engineering and postgraduate students of computer applications

Fundamentals of Numerical Computation (computer-oriented Numerical Analysis) G. Alefeld,R. D. Grigorieff,1980

**Computers and Their Applications to Chemistry** Ramesh Kumari,2005 Introduces the fundamentals of BASIC FORTRAN and C language using the concepts of Chemistry This book includes an

account of various statements input output format control if then else go to do loops and more has been illustrated by various examples     **Fundamentals of Numerical Computation (Computer-Oriented Numerical Analysis)** R Albrecht, U  
Kulisch, F Stummel, 1980-12-31     Computer Based Numerical & Statistical Techniques Goyal, 2005     *Numerical Methods  
and Computers* Shan Sun Kuo, 1965     Computer Applications of Numerical Methods Shan Sun Kuo, 1972

## **Computer Oriented Numerical Methods** Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its power to stir emotions, provoke thought, and instigate transformation is actually remarkable. This extraordinary book, aptly titled "**Computer Oriented Numerical Methods**," published by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we shall delve to the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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