




Lecture 1
On
Numerical Methods & Computer Programming

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Course Details


Course Code: CE 2201
Numerical Methods & Computer Programming
Credit: 4.00 (4 Class per week)
 Total No. of Class = 24
 Class test = 2 out of 4 (On Due Time)



Syllabus

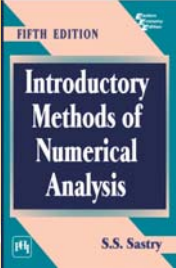
CE 2201 Numerical Methods & Computer Programming	
Lecture: 4 hrs/ week	Credit: 4.00

Basic components of computer system, FORTRAN and C/C++ language, numerical solution of algebraic and transcendental equations, matrices, solution of systems of linear equations, curve-fitting by least squares, finite differences, divided differences, interpolation, computer applications to Civil Engineering problems, numerical differentiation and integration, numerical solution of differential equations.



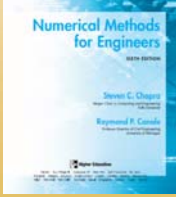
Introductory Methods of Numerical Analysis


Author: **S.S. Sastry**



Numerical Methods for Engineers

Authors: Steven C. Chapra
Raymond P. Canale





Numerical methods

- ❖ Numerical methods are techniques by which mathematical problems are formulated so that they can be solved with arithmetic operations.
- ❖ Although there are many kinds of numerical methods, they have one common characteristic: they invariably involve large numbers of tedious arithmetic calculations.
- ❖ It is little wonder that with the development of fast, efficient digital computers, the role of numerical methods in engineering problem solving has increased dramatically in recent years.

Solution of Algebraic and Transcendental Equation

ROOTS OF EQUATIONS

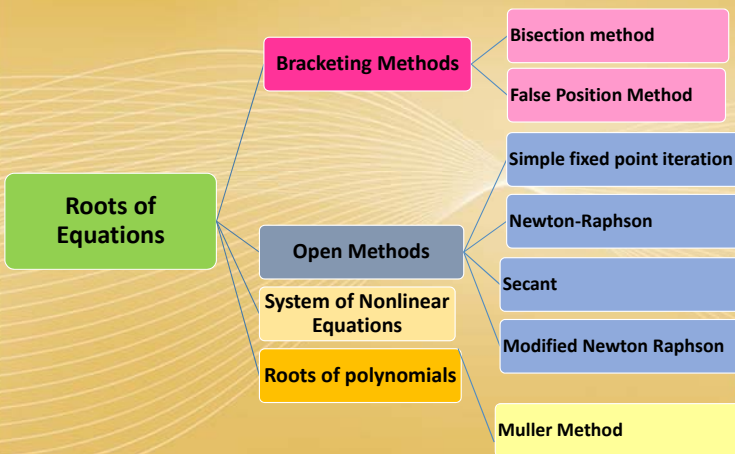
- Root of an equation: is the value of the equation variable which make the equations = 0.0

$$ax^2 + bx + c = 0 \Rightarrow x = \frac{-b \mp \sqrt{b^2 - 4ac}}{2a}$$

$$ax^5 + bx^4 + cx^3 + dx^2 + ex + f = 0 \Rightarrow x = ?$$

$$\sin x + x = 0 \Rightarrow x = ?$$

ROOTS OF EQUATIONS

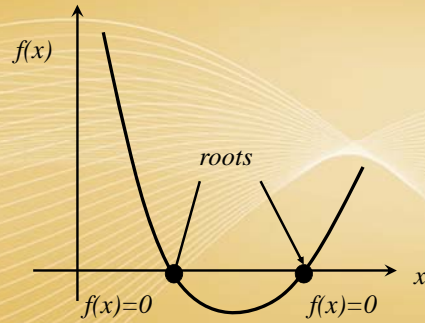


ROOTS OF EQUATIONS

- Non-computer methods:
 - Closed form solution (not always available)
 - Graphical solution (inaccurate)
- Numerical systematic methods suitable for computers

Graphical Solution

- Plot the function $f(x)$



- The roots exist where $f(x)$ crosses the x -axis.



Thank You