

# Numerical Analysis

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## Introduction

The numerical analysis involves the combined result of mathematics and computational ability of computers.

We study algorithms which finds the approximate solution of the equations involving continuous variables( different from Discrete Mathematics).

## Algorithms Overview

### Roots of polynomial equations:

- Bisection Method
- Regula-Falsi Method
- Fixed Point Iteration Method
- Newton-Raphson Method

### Numerical Integration:

- Trapezoidal Rule
- Simpson's 1/3rd Rule
- Simpson's 3/8th Rule
- Weddle's Rule

### The system of Linear Equations:

- **LU** Decomposition Method( Cholesky's Decomposition
- Gauss-Seidel Method
- Jacobi's Method

### Numerical Solution of Ordinary Differential Equations:

- Euler's Method
- Modified Euler's Method
- Runga-Kutta Method( of 4th Code)

Note: After reading the algorithms don't forget to analyze your solution with the exact answer of the equations. Hopefully, you have an idea about How to solve the equations not using the Numerical Methods.

As our answer consists of a decimal form of irrational numbers or non-terminating rational number just have a look on *Approximate Values, Significant figures, Rounding of a number* and *least possible error attended by rounding*, as we are dealing with the approximate solution.