Assignment Topics

Here are some potential assignment topics based on the course content:

Error Analysis

1. Investigate the effects of floating-point arithmetic on the accuracy of numerical computations. Provide e
2. Compare and contrast the sources of error in numerical computations, including truncation errors, roun

Nonlinear Equations

1. Implement the bisection method to find the roots of a given nonlinear equation. Compare its efficiency
2. Develop a program to solve a nonlinear equation using the fixed point iteration method. Analyze the co
3. Compare the Newton-Raphson method with the secant method for solving nonlinear equations. Discus

Interpolation and Polynomial Approximation

1. Use Lagrange interpolation to approximate a function at a given point. Compare the results with Newto
2. Develop a program to implement forward, backward, and centered difference formulae for interpolation
3. Investigate the application of polynomial approximation in curve fitting. Use a real-world example to illu

Numerical Differentiation

1. Implement forward, backward, and central difference formulae to approximate the derivative of a given
2. Use numerical differentiation to find the maximum or minimum of a function. Analyze the results and di

Numerical Integration

1. Implement the rectangular rule, trapezoidal rule, Simpson's 1/3 rule, and Simpson's 3/8 rule to approxi
2. Use numerical integration to solve a real-world problem, such as calculating the area under a curve or

Numerical Solution of Linear Equations

1. Implement the Jacobi method to solve a system of linear equations. Analyze the convergence of the m
2. Compare the Gauss-Seidel method with the Jacobi method for solving a system of linear equations. Di
3. Use numerical methods to solve a system of linear equations and analyze the effects of round-off error

These topics should provide a good starting point for assignments that cover the key concepts in the cou