

# Presentation Topics

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Here are some presentation topic suggestions based on the provided course outline:

## **\*\*Error Analysis\*\***

1. "The Dangers of Floating Point Arithmetic: Understanding Approximations and Errors"
2. "Error Propagation in Numerical Computations: Causes and Consequences"
3. "The Impact of Round-Off Errors on Numerical Results: A Case Study"

## **\*\*Methods for Solving Nonlinear Equations\*\***

1. "Root Finding Techniques: A Comparative Study of Bisection, Regula Falsi, and Fixed Point Iteration Methods"
2. "Newton's Method: The Power of Quadratic Convergence in Solving Nonlinear Equations"
3. "A Survey of Secant Methods: Efficient Solutions for Nonlinear Equations"
4. "The Battle of the Methods: A Performance Comparison of Nonlinear Equation Solvers"

## **\*\*Interpolation and Polynomial Approximation\*\***

1. "Polynomial Approximation: The Art of Lagrange Interpolation"
2. "The Power of Divided Differences: Newton's Formula for Interpolation"
3. "A Computational Analysis of Forward, Backward, and Centered Difference Formulae"
4. "Interpolation Techniques in Real-World Applications: A Case Study"

## **\*\*Numerical Differentiation\*\***

1. "Differentiation in the Digital Age: Forward, Backward, and Central Difference Formulae"
2. "The Art of Approximating Derivatives: Errors and Limitations"
3. "Numerical Differentiation in Practice: A Study of Computational Efficiency"
4. "The Role of Numerical Differentiation in Scientific Computing"

## **\*\*Numerical Integration\*\***

1. "The Quest for Accurate Integration: A Review of Numerical Methods"
2. "The Rectangular Rule: Simple yet Effective for Numerical Integration"
3. "The Trapezoidal Rule: A Balance of Accuracy and Efficiency"
4. "Simpson's Rules: High-Order Accuracy for Numerical Integration"
5. "A Comparative Study of Numerical Integration Methods: Which One to Choose?"

## **\*\*Numerical Solution of Linear Equations\*\***

1. "Indirect Methods for Solving Linear Systems: Jacobi and Gauss-Seidel Iterations"
2. "The Convergence of Iterative Methods: A Study of Jacobi and Gauss-Seidel"
3. "The Role of Numerical Methods in Solving Large-Scale Linear Systems"
4. "A Performance Comparison of Direct and Indirect Methods for Solving Linear Systems"

These topics should provide a good starting point for creating engaging and informative presentations on