

Course Outcome for Math Methods 2 & Lab 2:

1. Knowledge:

- Understand and apply the concepts of Second order linear homogeneous and nonhomogeneous Ordinary Differential Equations (ODEs).
- Demonstrate proficiency in solving ODEs using methods such as variation of parameters and undetermined coefficients.

2. Comprehension:

- Interpret the importance of eigenvalues and eigenvectors in solving ODEs and their relevance in understanding system dynamics.
- Analyze and interpret solutions to ODEs using eigenvalue-eigenvector methods.

3. Application:

- Utilize complex numbers and their graphical representation to solve mathematical problems, particularly in the context of differential equations involving complex roots.
- Apply the principles of complex variables and analyticity in solving mathematical problems and understanding functions in the complex plane.

4. Analysis:

- Evaluate and analyze numerical solutions to ODEs using numerical libraries such as numpy and scipy, and visualize the solutions using matplotlib.
- Analyze distribution functions and their applications in statistical analysis and probability theory.

5. Synthesis:

- Design and implement algorithms for linear least squares method for data fitting and model estimation.
- Integrate concepts of matrix inversion to solve systems of linear equations and analyze the solutions.

6. Evaluation:

- Assess the accuracy and efficiency of numerical methods in solving ODEs and evaluate the quality of solutions obtained using visualization techniques.
- Evaluate the performance of linear least squares method in fitting models to data and draw conclusions based on the results.

By the end of the course, students will be able to demonstrate a thorough understanding of Second order linear homogeneous and nonhomogeneous ODEs, eigenvalues and eigenvectors, complex numbers and their graphical representation, complex variables, distribution functions, linear least squares method, and matrix inversion. Students will also develop skills in utilizing numerical libraries for solving mathematical problems and visualizing solutions for better understanding and analysis.

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