Report on

Three-Day workshop on MATLAB

Dates: 26th to 28th Febraury 2024 at Dept. of ME, ATMECE, Mysore

Day 1- 26-02-2024

Inaugural Function

Department of Mechanical Engineering in association with ISTE student chapter, Organizing Three-Day workshop on MATLAB for Mechanical Engineering students.

Inauguration of the workshop was held in the seminar hall of Mechanical Engineering department ATMECE at 10:30 A M after the registration of the participants. The Chief Guests of the Program was **Dr. Roopa K M**, Dean, Skill Development, Student Welfare & liaison Officer, BIT Bangalore.

The function was presided by, Dr. Basavaraj L, Director- IQAC, ATMECE, Dr M S Govinde Gowda, Dean-Academics, and, Dr. Sacchidananda, Administrative Officer ATMECE were the guest of honor and Dr. Srinivasa K, Dean Student affair ATMECE Mysore was also present on the occasion.

The program begins with the Invocation by Vyshnavi, CSE Student. Dr. Chethan S, Program Convener and HOD ME, welcomed all to the function. The Workshop was declared open by Lighting the lamp by the dignitaries.

Prof. Raghu briefed about the workshop. Dr. M S Govinde Gowda, addressed about the workshop, MATLAB is widely used in engineering disciplines such as electrical, mechanical, civil, and aerospace engineering for tasks such as signal processing, control system design, image processing, computational fluid dynamics (CFD), finite element analysis (FEA), and optimization. It also provides powerful tools for data analysis, visualization, and statistical modeling. It is commonly used for exploratory data analysis, statistical hypothesis testing, regression analysis, and creating publication-quality plots and graphs. As technology continues to evolve, MATLAB is expected to remain a key enabler of interdisciplinary research and collaboration.

Dr. Basavaraj L, Director-IQAC, ATMECE, expressed about the MATLAB that it serves as a valuable interdisciplinary tool that bridges the gap between different fields of study by providing a common platform for numerical computation, data analysis, and modeling etc in their Presidential address.

Finally, Prof. Devaraj M R, Associate Professor, Dept. of ME, rendered vote of thanks.

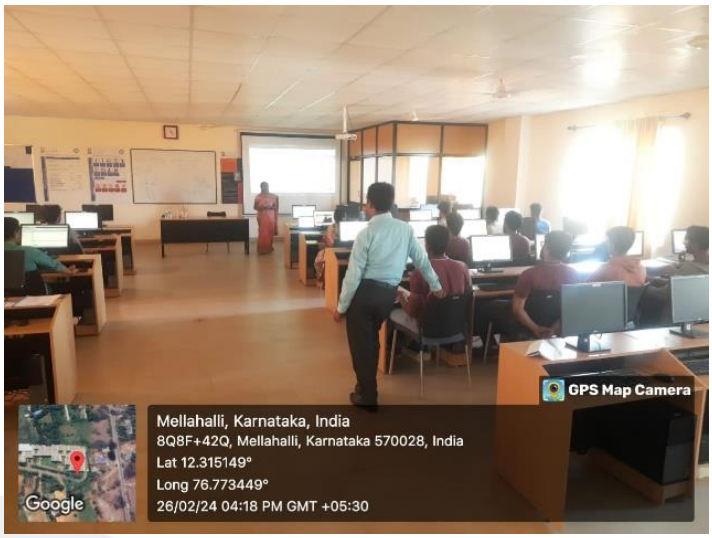
Afternoon Hands on session in Lab

A hands-on session in a lab introducing MATLAB programming typically covers several key topics to help participants become familiar with the basics of MATLAB and its various functionalities. Here's an outline of what such a session might entail:

Overview of MATLAB: Explain what MATLAB is, its applications, and its importance in scientific and engineering fields.

MATLAB Interface: Familiarize participants with the MATLAB environment including the Command Window, Editor, Workspace, and help documentation.

Basic Syntax: Introduce basic syntax rules, variables, and data types in MATLAB.



Day 2- 27-02-2024 Hands on session in Lab

Introduction to Arrays: Explain MATLAB's powerful array manipulation capabilities and how to create, index, and manipulate arrays.

Element-wise Operations: Demonstrate element-wise arithmetic operations and array slicing.

Matrix Operations: Introduce matrix operations such as multiplication, transposition, and inversion.

For Loops: Explain the syntax and usage of for loops for repetitive tasks.

While Loops: Introduce while loops and discuss their application for iterative tasks.

Conditional Statements: Cover if-else statements and switch-case constructs for decision making in code execution.

Scripts vs. Functions: Explain the difference between MATLAB scripts and functions and when to use each.

File Input/Output: Discuss methods for reading from and writing to files, including text files and spreadsheets.

Data Import and Export: Show how to import data from external sources like Excel, CSV files, and databases.

Plotting in MATLAB: Introduce MATLAB's plotting capabilities using functions like plot, scatter, and histogram.

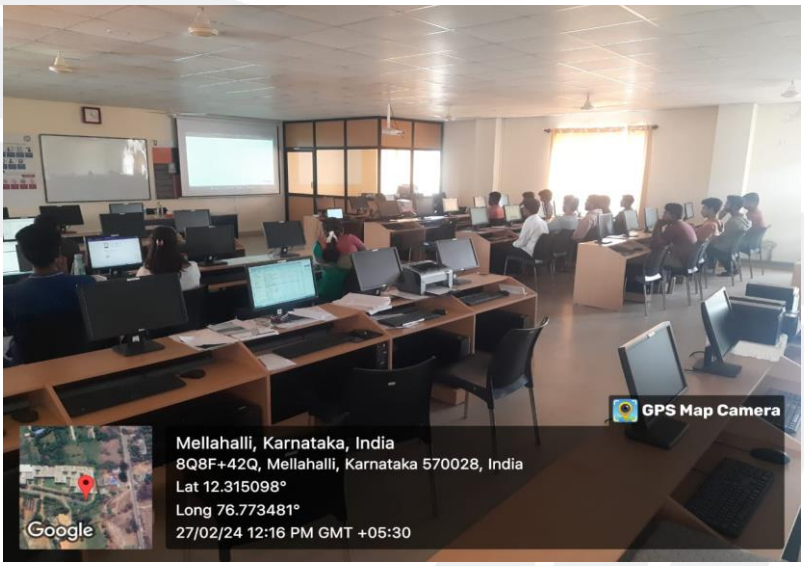
Customizing Plots: Discuss how to customize plots with titles, labels, legends, and formatting options.

Output Formatting: Demonstrate techniques for formatting output in the Command Window and saving results to files.

Curve fitting is a fundamental technique in numerical methods used to approximate the relationship between variables in data by finding a function that best fits the given data points. Two common types of curve fitting are straight line fitting and polynomial fitting. MATLAB provides powerful tools for performing these curve fitting tasks efficiently.

Straight Line Fit: A straight line fit, also known as linear regression, involves finding the best-fitting straight line to a given set of data points.

Polynomial fit: Polynomial fitting involves finding a polynomial function of a given degree that best fits the data points.



Day 3- 28-02-2024 Hands on Session in Lab

Linear and Nonlinear Equations: Eigen values, Eigen vectors, Solution of linear algebraic equations using Gauss Elimination and LU decomposition, Solution of nonlinear equation in single variable using Gauss-Siedal and Newton-Raphson method.

Linear and nonlinear equations are ubiquitous in various fields of science and engineering. MATLAB provides powerful tools for solving these equations efficiently.

Eigenvalues and eigenvectors are essential concepts in linear algebra, commonly used in various mathematical and engineering applications.

MATLAB provides built-in functions to compute eigenvalues and eigenvectors efficiently. Here's how can work with eigenvalues and eigenvectors in MATLAB**.**

Gauss elimination and LU decomposition are methods for solving systems of linear equations. Gauss elimination involves row operations to transform the system into triangular form, while LU decomposition decomposes the coefficient matrix A into lower and upper triangular matrices L and U.

MATLAB provides built-in functions like linsolve for solving systems of linear equations. For LU decomposition, the LU function decomposes a matrix into L and U factors.

Gauss-Seidel and Newton-Raphson methods are iterative techniques for solving nonlinear equations. MATLAB provides flexibility in implementing these methods using loops or vectorized operations. Implementation of Gauss-Seidel and Newton-Raphson methods in MATLAB functions and apply them to solve specific nonlinear equations.

Valedictory Session

Valedictory function of Three-Day Workshop on Basic MAT Lab was held at Seminar Hall, Department of Mechanical Engineering ATMECE which was presided over by the Resource person, **Dr. Roopa K M**, Dean, Skill Development, Student Welfare & liaison Officer, BIT Bangalore. Prof, Ravikumar S, Asst. Prof. Dept of ME, extended a warm welcome to the Chief Guest as well as all participants of the course, Coordinators of the program, faculty members of the department. Prof. Raghu presented a gist of proceedings of the Three-Day Workshop and mentioned that it is high time for the students to acquire knowledge on MAT lab courses and develop competence that will lead to career advancement. The participants were invited to give feedback on the Basic MAT Lab. Prof. Devaraj M R concluded the program by rendering the vote of thanks.