REPORT ON MATLAB WORKSHOP (7th April. 2018)
For
DEPARTMENT OF ELECTRICAL ENGINEERING

Objective-The workshop was based on the Basic of MATLAB.

Resource Persons

Poornima Institute of Engineering & Technology, Jaipur Electrical Engineering department conducted a workshop on MATLAB with technical support by IIHT PVT. LTD on 7th April. 2018. The workshop was based on the Basics of MATLAB.

Introduction to MATLAB

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. Typical uses include:

- Math and computation
- Algorithm development
- Modeling, simulation, and prototyping
- Data analysis, exploration, and visualization
- Scientific and engineering graphics
- Application development, including Graphical User Interface building

MATLAB is an interactive system whose basic data element is an array that does not require dimensioning. This allows you to solve many technical computing problems, especially those with matrix and vector formulations, in a fraction of the time it would take to write a program in a scalar non interactive language such as C or FORTRAN.

The name MATLAB stands for matrix laboratory. MATLAB was originally written to provide easy access to matrix software developed by the LINPACK and EISPACK projects, which together represent the state-of-the-art in software for matrix computation.

MATLAB has evolved over a period of years with input from many users. In university environments, it is the standard instructional tool for introductory and advanced courses in mathematics, engineering, and science. In industry, MATLAB is the tool of choice for high- productivity research, development, and analysis.

MATLAB features a family of application-specific solutions called toolboxes. Very important to most users of MATLAB, toolboxes allow you to *learn* and *apply* specialized technology. Toolboxes are comprehensive collections of MATLAB functions (M-files) that extend the MATLAB environment to solve particular classes of problems. Areas in which toolboxes are available include signal processing, control systems, neural networks, fuzzy logic, wavelets, simulation, and many others.

MATLAB is a fourth-generation programming language and numerical analysis environment. Uses for MATLAB include matrix calculations, developing and running algorithms, creating user interfaces (UI) and data visualization. The multi-paradigm numerical computing environment allows developers to interface with programs developed in different languages.

MATLAB is used by engineers and scientists in many fields such as image and signal processing, communications, control systems for industry, smart grid design, robotics as well as computational finance.

MATLAB System

MATLAB system consists of five main parts:

MATLAB language

This is a high-level matrix/array language with control flow statements, functions, data structures, input/output, and object-oriented programming features. It allows both "programming in the small" to rapidly create quick and dirty throw-away programs, and "programming in the large" to create complete large and complex application programs.

MATLAB working environment

This is the set of tools and facilities that you work with as the MATLAB user or programmer. It includes facilities for managing the variables in your workspace and importing and exporting data. It also includes tools for developing, managing, debugging, and profiling M- files, MATLAB's applications.

Handle Graphics

This is the MATLAB graphics system. It includes high-level commands for two-dimensional and three-dimensional data visualization, image processing, animation, and presentation graphics. It also includes low-level commands that allow you to fully customize the Appearance of graphics as well as to build complete Graphical User Interfaces on your MATLAB applications.

MATLAB Application Program Interface (API)

This is a library that allows you to write C and Fortran programs that interact with MATLAB. It include facilities for calling routines from MATLAB (dynamic linking), calling MATLAB as a computational engine, and for reading and writing MAT-files.

Start of MATLAB:-

Mac: Double-click on the icon for MATLAB.
PC: Choose the submenu "Programs" from the "Start" menu. From the "Programs" menu, open the "MATLAB" submenu. From the "MATLAB" submenu, choose "MATLAB".
Unix: At the prompt, type matlab.

You can quit MATLAB by typing exitin the command window.

Useful functions and operations in MATLAB:-

Using MATLAB as a calculator is easy.

Example: Compute 5 sin (2.5^{3-pi}) +1/75.

In MATLAB this is done by simply typing
5*sin   (2.5^   (3-pi))
+1/75

In the afternoon session, students were given hands on training in solving problems at EEE Simulation Lab. The entire session was very interactive and the students have been demonstrated with various programs related to circuit analysis. The tutorial session created an interested in learning this software and they have been given an assignment that comprises of a set of creative questions for continuous learning process.

The workshop was ended with a feedback session by the students. In that, they have expressed their interest and willingness in attending the next workshop of this series.

Photographs:-