

# Paper – I

## MATLAB Programming for Engineers

### Unit I :- Introduction to MATLAB

- 1.1 The Advantages of MATLAB
- 1.2 Disadvantages of MATLAB
- 1.3 The MATLAB Environment
- 1.4 Using MATLAB as a Scratch Pad
- 1.5 Summary
- 1.6 Exercises

### Unit II :- MATLAB Basics

- 2.1 Variables and Arrays
- 2.2 Initializing Variables in MATLAB
- 2.3 Multidimensional Arrays
- 2.4 Sub arrays
- 2.5 Special Values
- 2.6 Displaying Output Data
- 2.7 Data Files
- 2.8 Scalar and Array Operations
- 2.9 Hierarchy of Operations
- 2.10 Built-in MATLAB Functions
- 2.11 Introduction to Plotting
- 2.12 Examples
- 2.13 Debugging MATLAB Programs
- 2.14 Summary
- 2.15 Exercises

### Unit III :- Input / Output Functions

- 3.1 The textread Function
- 3.2 More about the load and save Commands
- 3.3 An Introduction to MATLAB File Processing
- 3.4 File Opening and Closing
- 3.5 Binary I/O Function
- 3.6 Formatted I/O Function
- 3.7 Comparing Formatted and Binary I/O Functions
- 3.8 File Positioning and Status Functions
- 3.9 The text scan Function
- 3.10 Function uimport
- 3.11 Summary
- 3.12 Exercises

**Text book:** MATLAB Programming for Engineers By Stephen J. Chapman

**Reference Book :**

1. MATLAB 7 By Rudra Pratap, Oxford University Press.
2. MATLAB An Introduction With Applications By Amos Gilat, Wiley Publication.
3. MATLAB and Its Applications In Engineering By R.K. Bansal, A.K. Goel,

# Paper – II

## MATLAB An Introduction with Applications

### Unit I :-Two – Dimensional Plots

- 1.1 The Plot COMMAND
- 1.2 The fplot COMMAND
- 1.3 Plotting Multiple Graphs In The Same Plot
- 1.4 Formatting A Plot
- 1.5 Plots With Logarithmic Axes
- 1.6 Plots With Error Bars
- 1.7 Plots With Special Graphics
- 1.8 Histograms
- 1.9 Polar Plots
- 1.10 Putting Multiple Plots on The Same Page
- 1.11 Multiple Figure Windows
- 1.12 Examples of MATLAB Applications
- 1.13 Problems

### Unit II :-Three-Dimensional Plots

- 2.1 Line Plots
- 2.2 Mesh and Surface Plots
- 2.3 Plots With Special Graphics
- 2.4 The View Command
- 2.5 Examples of MATLAB Application
- 2.6 Problems

### Unit III :-Applications in Numerical Analysis

- 3.1 Solving an Equation With One Variable
- 3.2 Finding A Minimum or A Maximum of A Function
- 3.3 Numerical Integration
- 3.4 Ordinary Differential Equations
- 3.5 Examples of MATLAB Applications
- 3.6 Problems

**Text book:** MATLAB An Introduction With Applications By Amos Gilat,  
Wiley Publication.

**Reference Book :** 1. MATLAB 7 By Rudra Pratap, Oxford University Press.  
2. MATLAB Programming for Engineers By Stephen J. Chapman  
3. MATLAB and Its Applications In Engineering By R.K. Bansal, A.K. Goel,

# Paper – III

## MATLAB And Its Applications In Engineering

### Unit I :- Constants, Variables and Expressions

- 1.1 Introduction
- 1.2 Character set
- 1.3 Data Types
- 1.4 Constants and Variables
- 1.5 Operators
- 1.6 Hierarchy of Operations
- 1.7 Built-in Functions
- 1.8 Assignment Statement
- 1.9 Illustrative Programs
- 1.10 Summary

### Unit II :- Writing Programs and Functions of Polynomials

- 2.1 Introduction
- 2.2 Entering A Polynomial
- 2.3 Polynomial Evaluation
- 2.4 Rots of A Polynomial
- 2.5 Polynomial Addition And Subtraction
- 2.6 Polynomial Multiplication
- 2.7 Polynomial Division
- 2.8 Formulation of Polynomial Equation
- 2.9 Polynomial Differentiation
- 2.10 Polynomial Integration
- 2.11 Polynomial Curve Fitting.
- 2.12 Evaluation of Polynomials With Matrix Arguments
- 2.13 Summary

### Unit III :- MATLAB Applications in O. D. E. and Symbolic Mathematics

- 3.1 Introduction
- 3.2 Ordinary Differential Equation Solvers
- 3.3 Symbolic Mathematics
- 3.4 Summary

**Text book:** MATLAB and Its Applications In Engineering By R.K. Bansal, A.K. Goel, Pearson Publication.

**Reference Book :**

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- 2. MATLAB Programming for Engineers By Stephen J. Chapman
- 3. MATLAB An Introduction With Applications By Amos Gilat, Wiley Publication.

## MATLAB COC Practical Paper – I

- 1) For a square matrix  $A$  to find  $A^2, A^3, A^4, A^5$ .
- 2) For two matrices  $A$  and  $B$ , confirmable for multiplication from both sides, to find  $AB$  and  $BA$ .
- 3) To find the rank of the matrices.
- 4) To find the eigen vectors of a square matrix.
- 5) To Plot the contours of  $z = \cos x \cos y \exp -\sqrt{x^2 + y^2} / 4$  over the default domains.
- 6) To plot multiple graphs  $y_1 = \sin t, y_2 = t, y_3 = 1 \frac{t^3}{3!} + \frac{t^5}{5!}$  in same figure window.
- 7) To plot  $f(t) = t \sin t, 0 \leq t \leq 10\pi$
- 8) To plot the surface  $z = \frac{xy(x^2 - y^2)}{x^2 + y^2}, -3 \leq x \leq 3, -3 \leq y \leq 3$  by computing the values of  $z$  over 50 x 50 grid on specified domain.
- 9) To plot the graph of  $r^2 = 2 \sin 5t, 0 \leq t \leq 2\pi$  taking 200 points.
- 10) To Find the graphical solution of differential equation  $dx/dt = -2x$  with initial condition  $x_0 = 1$  in the range  $0 < t \leq 10$  and draw the graph of the solution by using ode 23 solver.
- 11) To Find the derivative of i)  $a = \sin(\omega t)$ , w.r.t  $t$  ii)  $a = x^n$ , w.r.t  $x$
- 12) To Find out root of 10  
1] When it expressed in data type. 2] when it expressed as symbolic type.
- 13) To show that the vectors  $V_1 = (2, -1, 0, 3), V_2 = (1, 2, 5, -1), V_3 = (7, -1, 5, 8)$  are linearly independent.
- 14) To find i) inner product of  $u$  and  $v$ . ii)  $\cos \theta$  between  $u$  and  $v$ . iii)  $\|u\|, \|v\|$ . iv)  $\|u-v\|$ .
- 15) To find the resultant vector moment of the forces  $2i+7j, 2i-5j+6k, -i+2j+k$  acting at the point  $P(4, -3, -2)$  about the point  $Q(6, 1, -3)$ .
- 16) To draw the MATLAB logo ( $z = \cos x \cos y e^{-\frac{\sqrt{x^2 + y^2}}{4}}$  for  $|x| \leq 5, |y| \leq 5$ ).
- 17) To draw the pie chart for the world population by continents for data.
- 19) To find the population of the country in the year 1925 using following data
 

Year	1891	1901	1911	1921	1931
Population:	46000	66000	81000	93000	101000
- 20) To find the number of students who obtained less than 45 marks using following data
 

Marks (less then) :	40	50	60	70	80
No. of Students :	31	73	124	159	190
- 21) Let us compute the following integral
 
$$\int_{1/2}^{3/2} e^{-x^2} dx$$
- 22) This integral is closely related to the error function, erf. In fact,
 
$$\int_{1/2}^{3/2} e^{-x^2} dx = \frac{\sqrt{\pi}}{2} \text{erf}(x)$$
- 23) Let us compute the following integral
 
$$I = \int_{-1}^1 \int_0^2 1 - 6x^2 y \, dx \, dy$$
- 24) Let us take a simple example
 
$$\int_0^1 \int_y^1 x^2 e^{xy} \, dx \, dy$$

## MATLAB COC Practical Paper – II

1. To do simple arithmetic calculations
2. To calculate Exponential and logarithms
3. To calculate values of Trigonometric function
4. Creating and working with arrays of numbers
5. To use the trigonometric functions with array arguments
6. To find sum of Geometric series
7. To compute dot product of vectors
8. To compute cross product of vectors
9. To compute box and vector triple product
10. To Compute angle between two vectors
11. To calculate interest of your money
12. To define the function using variable as symbol
13. To find out left and right limit of a given function
14. To find limit of a function
15. To find derivative of a function
16. To find integration when limits are not given
17. To find integration when limits are given
18. To find values of Beta and Gamma functions
19. To find roots of equation
20. Simple 2-D plots
21. Plotting with function fplot, ezplot

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  3. MATLAB and Its Applications In Engineering By R.K. Bansal, A.K. Goel,
  4. MATLAB An Introduction With Applications By Amos Gilat, Wiley Publication.
  5. Introduction to Neural Networks Using MATLAB By S.N. Sivanandam, S. Sumathi.
  6. An Introduction to Numerical Methods A MATLAB Approach.