

Salahaddin University – Erbil

Education College

Physics Department



# MATLAB

## Lecture One

# Introduction

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## 1. Introduction

The most frequently used high-level languages are summarized as follows:

- **Fortran:** This language was introduced by IBM in 1957 and is one of the first languages widely adopted and used by the scientific community. The main objective was to solve complex mathematical problems.
- **Formula calculator (FOCAL):** This language consists of simple instructions designed to serve the scientific community.
- **Algorithmic language (ALGOL):** This language was developed mainly by John Backus and introduced in 1958 as a universal, multipurpose language.

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- **Common business-oriented language (COBOL):** This language was introduced in 1958 to serve the business community in accounting and inventories.
- **PL/1:** This language was introduced in 1966 by IBM as a multipurpose language designed for both the scientific and business communities.
- **BASIC:** This language was developed at Dartmouth College in the late 1970s and early 1980s and introduced in 1976. The instructions and algebraic equations are English-like and similar to Fortran. It was a popular computer language developed to be used as a teaching tool in colleges and universities. In the 1990s, the language evolved into Visual Basic.

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- **Lisp:** This language is a symbolic, tree-structure language used for searches, qualitative decision-making, and artificial intelligence applications.
- **A programming language (APL):** This language was developed by Iverson at the IBM Corporation. The main feature is that it consists of operators that can carry out functions requiring dozens of statements in other languages.
- **Pascal (and Modula-2):** This language was developed in 1968, pioneered by Niklaus Wirth, and named after the eighteenth-century French mathematician Blaise Pascal. It is a language that is essentially machine-independent and is particularly useful for building data structures.

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- **Forth:** This language was designed basically for process control applications by Charles Moore in the late 1960s.
- **Ada:** This language was developed in the early 1980s for the U.S. Department of Defense. It is a modular language. The National Aeronautics and Space Administration (NASA) is one of the main users. Its space shuttle employs over 1 million lines of Ada's programming code.
- **C, C++:** This language was developed by Dennis Richie at the Bell Telephone Laboratories in the early 1970s. The original language combined the properties and features of high- and low-level programming languages. It is a modular language and its main application is in the control of the computer hardware.

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- **Simula:** comprehensive school mathematics program (CSMP), general purpose simulation system (GPSS), electronics workbench, MicroSim, PSpice, laboratory virtual instrumentation engineering workbench (LabVIEW), SIMSCRIPT, graph algorithm and software package (GASP) are very specialized simulation and control computer languages.
- **Mathematica:** This language was developed by Wolfram Research Inc. and is primarily used by engineers and scientists. Its main applications include numerical, graphical, and art schematic computations.
- **Programmation en logique (Prolog):** This language is based on formal logic and is considered by engineers and scientists as the fifth-generation computer language.

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- **Mathcad:** This language was developed by MathSoft Inc., Massachusetts, and designed for engineering and scientific computation.
- **Java:** This language was developed by Sun Microsystems and introduced during the SunWorld'95 Conference in May 1995. Java is a network-oriented programming language used to facilitate efficient communications among many diverse electronic terminal devices in a home or business environment.
- **Hypertext markup language (HTML):** This is a universal, simple language for formatting, embedding of images and graphics, and hypertextual linking, also called hyperlinks of documents. This language is used in Web pages. HTML is defined by SGML and is a language that is independent of the terminal devices.

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- **MATLAB** is a high-level technical computing language and interactive environment for algorithm development, data visualization, data analysis, and numerical computation. Using MATLAB, you can solve technical computing problems faster than with traditional programming languages, such as C, C++, and Fortran(The MathWorks, Inc.).
- **MATLAB (short for MATrix LABoratory)** is a special-purpose computer program optimized to perform engineering and scientific calculations. It started life as a program designed to perform matrix mathematics, but over the years it has grown into a flexible computing system capable of solving essentially any technical problem.

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Year	Version	Notable features
1978	Classic MATLAB	Original Fortran version.
1984	MATLAB 1	Rewritten in C.
1985	MATLAB 2	30% more commands and functions, typeset documentation.
1987	MATLAB 3	Faster interpreter, color graphics, high-resolution graphics printing.
1992	MATLAB 4	Sparse matrices, animation, visualization, user interface controls, debugger, Handle Graphics®,* Microsoft Windows support.
1997	MATLAB 5	Profiler, object-oriented programming, multidimensional arrays, cell arrays, structures, more sparse linear algebra, new ordinary differential equation solvers, browser-based help.
2000	MATLAB 6 (R12)	MATLAB desktop including Help browser, matrix computations based on LAPACK with optimized BLAS, function handles, eigs interface to ARPACK, boundary value problem and partial differential equation solvers, graphics object transparency, Java support.
2002	MATLAB 6.5 (R13)	Performance acceleration, improved speed in core linear algebra functions for Pentium 4, more control in warning and error handling.
2004	MATLAB 7.0 (R14)	Mathematics on nondouble operands (single precision, integer), anonymous functions, nested functions, publishing an M-file to HTML, $\LaTeX$ , etc., enhanced plot annotation.

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MATLAB 7.0.1	R14SP1	October, 2004	
MATLAB 7.0.4	R14SP2	March 7, 2005	
MATLAB 7.1	R14SP3	September 1, 2005	
MATLAB 7.2	R2006a	March 1, 2006	
MATLAB 7.3	R2006b	September 1, 2006	
MATLAB 7.4	R2007a	March 1, 2007	
MATLAB 7.5	R2007b	September 1, 2007	Last release for Win. 2000 and PowerPC Mac
MATLAB 7.6	R2008a	March 1, 2008	New Class-Definition Syntax
MATLAB 7.7	R2008b	October 9, 2008	
MATLAB 7.8	R2009a	March 6, 2009	First release for 32-bit & 64-bit Microsoft Win. 7
MATLAB 7.9	R2009b	September 4, 2009	
MATLAB 7.9.1	R2009bSP1	April 1, 2010	
MATLAB 7.10	R2010a	March 5, 2010	
MATLAB 7.11	R2010b	September 3, 2010	
MATLAB 7.11.1	R2010bSP1	March 17, 2011	
MATLAB 7.12	R2011a	April 8, 2011	
MATLAB 7.13	R2011b	September 1, 2011	
MATLAB 7.14	R2012a	March 1, 2012	
MATLAB 8	R2012b	September 11, 2012	First release with Tool strip interface
MATLAB 8.1	R2013a	2013 March 7, 2013	New unit testing framework
MATLAB 8.2	R2013b	September 6, 2013	New table data type

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5. Simulink  
A Simple Differential Equation, An Engineering Example, Communication with the Workspace
  6. GUIs  
GUI Layout and GUIDE, Saving and Running a GUI, GUI Callback Functions

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### References

1. Basics of MATLAB and beyond, By Andrew Knight, CRC Press, USA, 1st Edition, 2000.
2. MATLAB Demystified, By David McMahon, McGraw-Hill Companies, USA, 1st Edition, 2007.
3. Different internet sources.