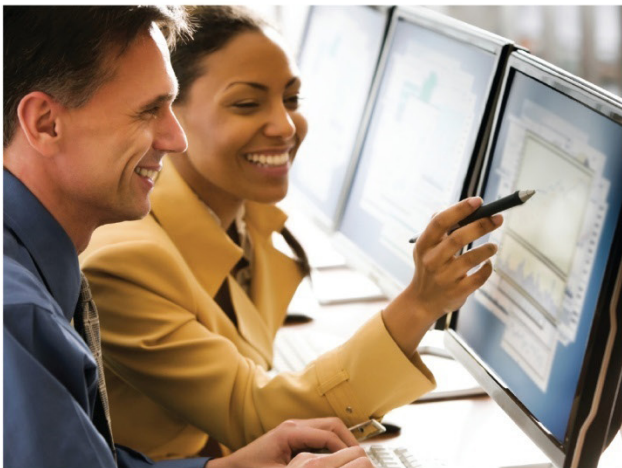


Introduction

MATLAB® Fundamentals for Aerospace Applications



MathWorks® at a Glance

MathWorks® is the leading developer of mathematical computing software in the world.

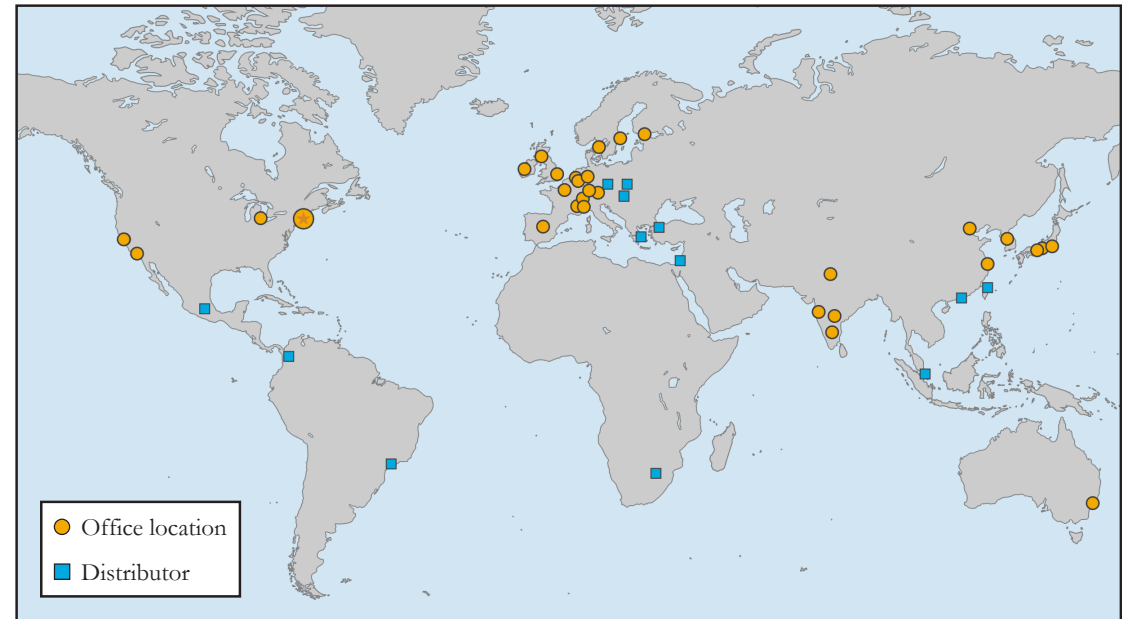
- Privately held
- Over 4000 employees worldwide
- More than 2 million users in 180+ countries

MathWorks products are relied upon by a variety of key industries to accelerate the pace of discovery, innovation, development, and learning, including

- Aerospace and defense
- Automotive
- Biological sciences
- Biotech and pharmaceutical
- Communications
- Electronics
- Energy production
- Financial services
- Industrial automation and machinery
- Medical devices
- Metals, materials, and mining
- Neuroscience
- Railway systems
- Semiconductors
- Software and internet

MathWorks supports programs that inspire learning and advance education in engineering, science, and math.

- 5000+ universities around the world
- 1800+ MATLAB® and Simulink® based books
- Academic support for research, fellowships, student competitions, and curriculum development



MathWorks supports its customers through a worldwide network of offices, distributors, and resellers.

Headquarters (Natick, MA USA)

www.mathworks.com

support@mathworks.com

+1-508-647-7000

Worldwide Offices

For information on any of our worldwide offices, please open the following location on the MathWorks site and choose a country:

www.mathworks.com/company/worldwide/

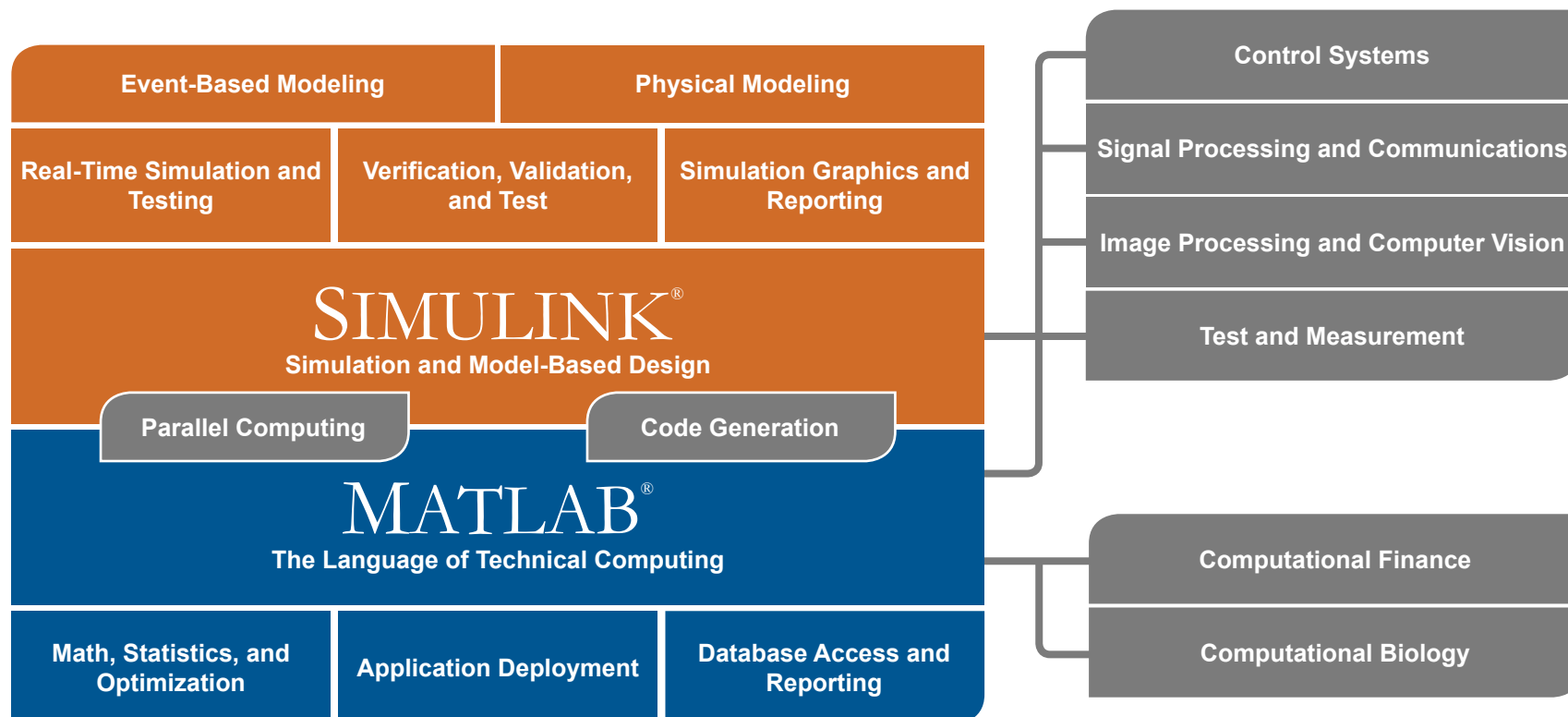
MathWorks® Product Overview

Key Characteristics of MATLAB

- The industry-standard, high-level programming language for algorithm development
- Numeric computation
- Parallel computing, with multicore and multiprocessor support
- Data analysis and visualization
- Toolboxes for signal and image processing, statistics, optimization, symbolic math, and other areas
- Tools for application development and deployment

Key Characteristics of Simulink

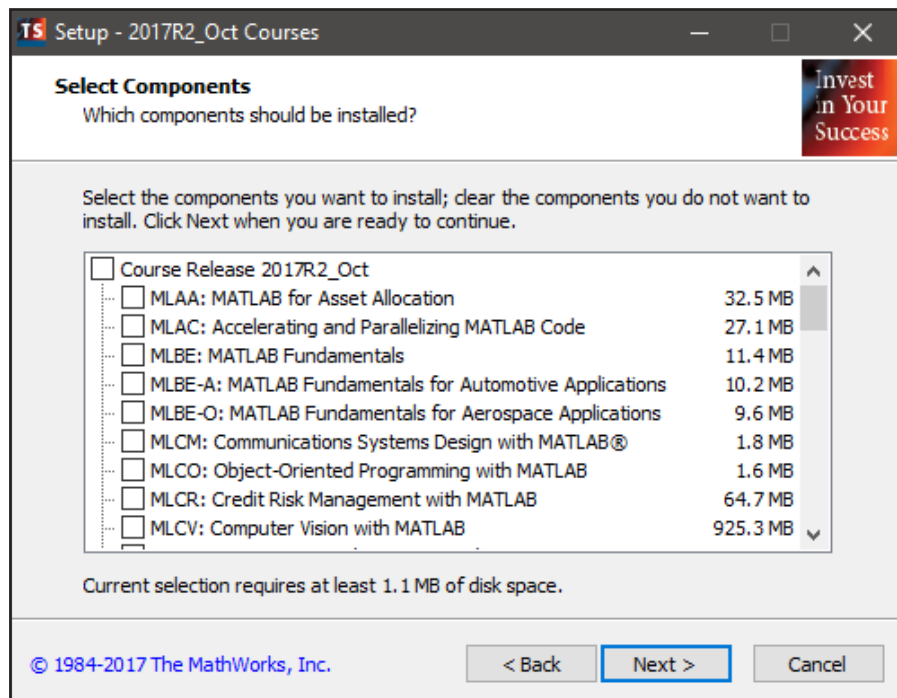
- Linear, nonlinear, discrete-time, continuous-time, hybrid, and multirate systems
- Foundation for Model-Based Design, including multidomain system modeling, real-time testing, automatic code generation, and verification and validation
- Open architecture for integrating models from other tools
- Applications in controls, signal processing, communications, physical modeling, and other system engineering areas



Computer Setup

To get ready for class, you need to install the examples and exercises from your course DVD or from a USB drive provided by the instructor. Follow these steps:

1. Put the DVD in the DVD drive or plug in the USB drive.
2. The installer application will open automatically. If the installer application does not open automatically, open the DVD drive or USB drive in Windows® Explorer. Run the file `English_20XXRX_MMM.exe`.
3. Follow the prompts in the installer through the installation process. A shortcut will be created on your desktop to start MATLAB for this class.

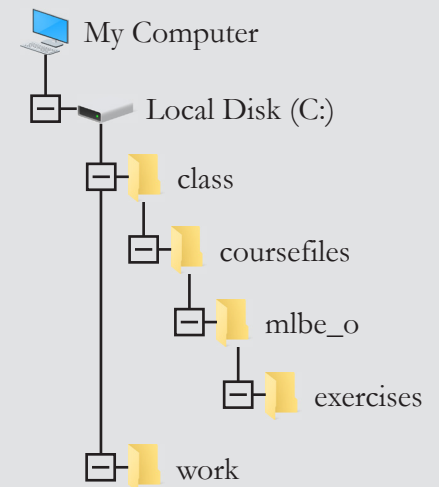


Typical setup

The installation creates a subdirectory of your chosen root directory (the default is `C:\class`) called `coursefiles`. This directory has subdirectories for each of the courses you install.

Each course directory has a subdirectory called `exercises` that contains all exercises and their solutions.

There is a subdirectory called `work`, which is empty. During class, put all your work in this subdirectory, so that it is on the path and easy to find.



In the installer, you have the following options:

- Choose a class root directory for your course files.
- Choose the courses for which you need to install the files. (Examples and exercises for all of our courses are on the DVD or USB drive.)
- Create a shortcut on the desktop to start MATLAB for this class. (This shortcut runs a `startup.m` file when starting MATLAB, that is customized for the installed course files)

Note A minimalistic install can be performed by navigating to the DVD drive or USB drive in MATLAB, executing the `installer.m` script inside the `zipfiles` folder, and selecting the appropriate courses to install.

What Can You Do with MATLAB®?

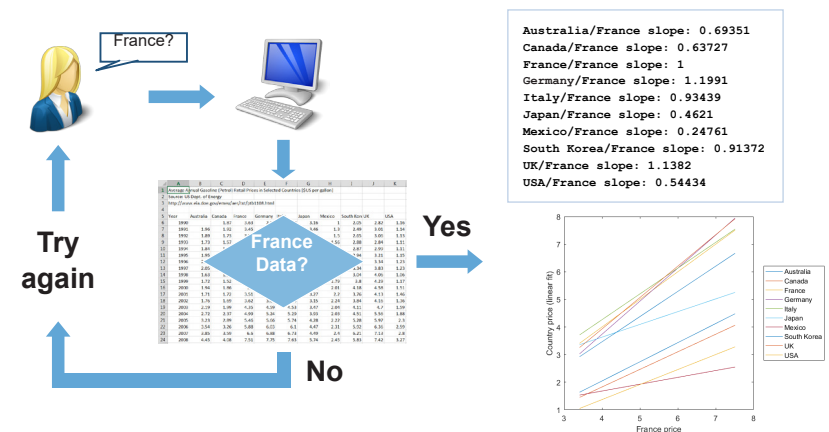
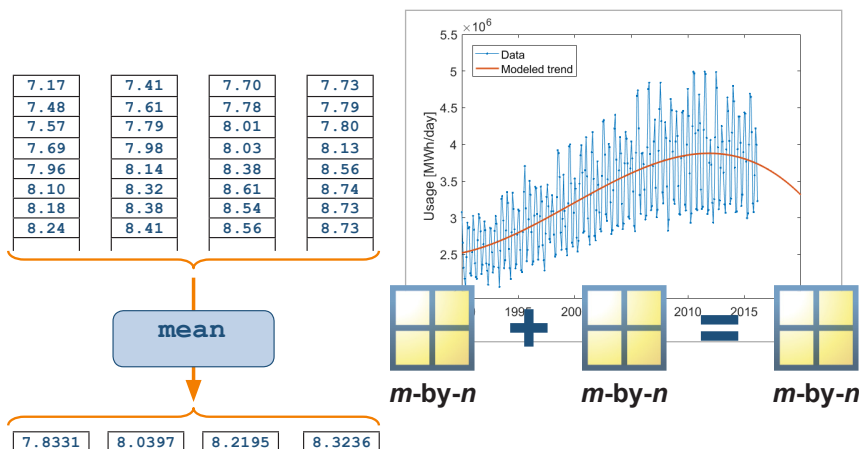
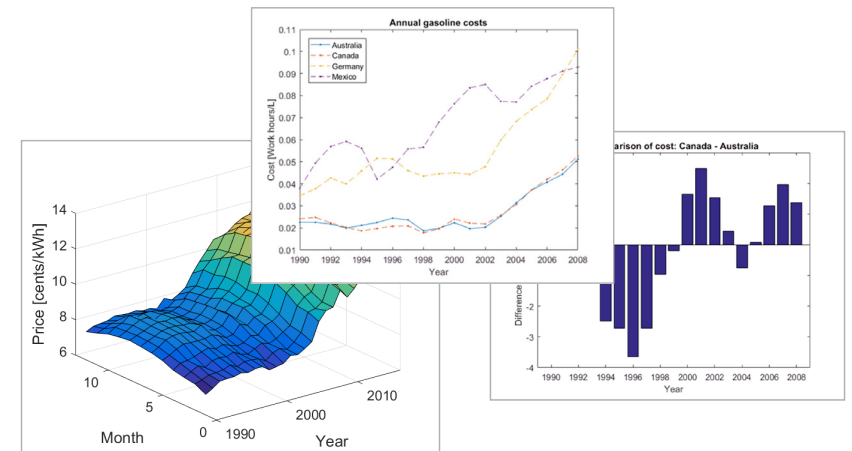
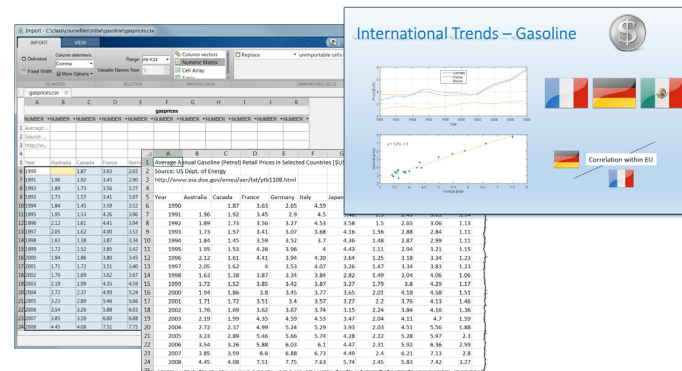
In this course, you will

- Interactively import, analyze, and export data.
- Write programs to automate complex tasks.
- Import data from a variety of file formats.
- Perform calculations and analysis on data sets.
- Create informative data visualizations.

Try

Example files in the C:\class\coursefiles\mlbe_o\ directory:

- gasoline\comparecosts.mlx
- electricity\electricityanalysis.mlx
- epl\EPLscoring.mlx



Course Learning Outcomes

The attendee will be able to

- Navigate the MATLAB user interface.
- Enter MATLAB commands.
- Create, access, and modify vectors and matrices.
- Perform calculations with vector and matrix data.
- Create visualizations of vector and matrix data.
- Import data from a file.
- Write and debug scripts and functions.

Course Outline

Day 1

- Introduction
- Working with the MATLAB® User Interface
- Variables and Commands
- Analysis and Visualization with Vectors

Day 2

- Analysis and Visualization with Matrices
- Tables of Data
- Conditional Data Selection
- Organizing Data

Day 3

- Analyzing Data
- Increasing Automation with Programming Constructs
- Increasing Automation with Functions
- Conclusion

Appendices

- MATLAB® Reference
- Exercises

Time series of gasoline costs in four countries.
See Chapter 4: "Analysis and Visualization with Vectors"

