

# MathWorks®

*Accelerating the pace of engineering and science*

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The leading developer of mathematical computing software for engineers and scientists.

# Our software is used to design the products we rely on every day



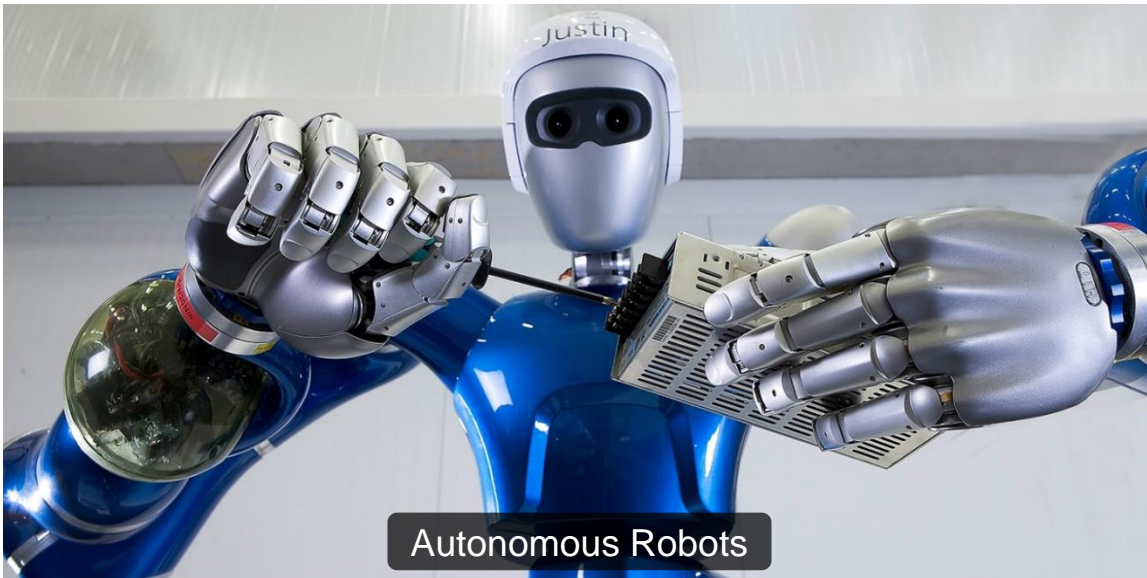
# And the breakthroughs transforming how we live, learn, and work



Reusable Rockets



Advanced Prosthetics

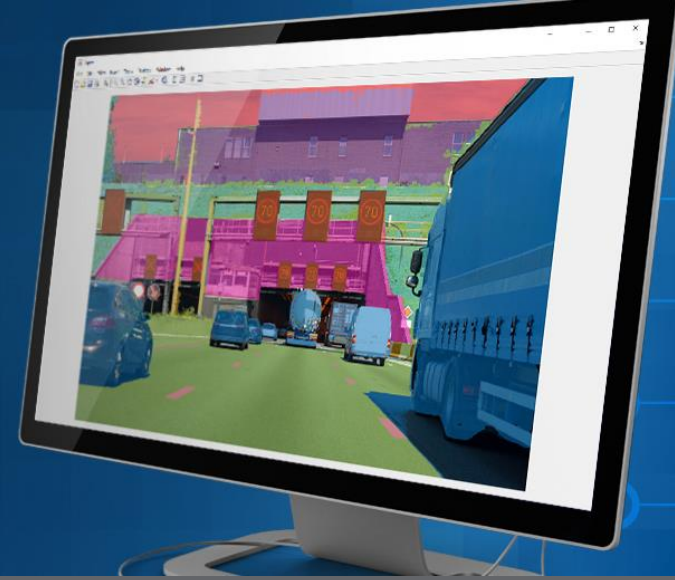


Autonomous Robots



Clean Energy

# MATLAB<sup>®</sup> & SIMULINK<sup>®</sup>



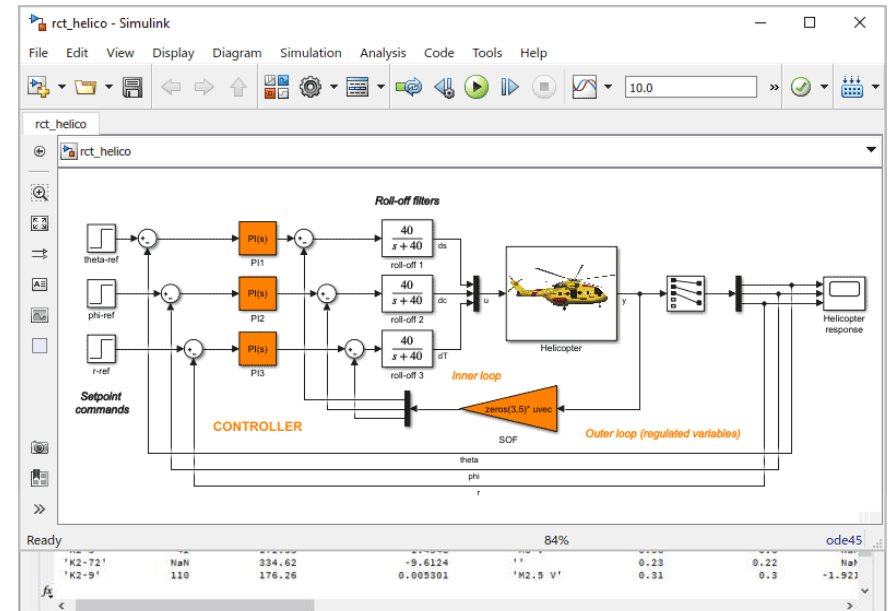
## Our Products

MATLAB is a programming environment for algorithm development, data analysis, visualization, and numeric computation.

Simulink is a graphical environment for designing, simulating, and testing systems.

Nearly 100 add-on products for specialized tasks.

## System Toolbox





# Our Customers

Millions of engineers and scientists worldwide use MATLAB and Simulink.



90,000+ business, government, and university sites



All of the top 10 auto manufacturers<sup>1</sup>



All of the top 10 aerospace companies<sup>2</sup>



Three of the top five internet companies

<sup>1</sup>OICA: 2016 World Motor Vehicle Production

<sup>2</sup>PwC: Aerospace and Defense 2017 Year in Review

# Our Customers / Key Industries



**Aerospace and Defense**



**Automotive**



**Biological Sciences**



**Biotech and Pharmaceutical**



**Communications**



**Electronics**



**Energy Production**



**Financial Services**



**Industrial Machinery**



**Medical Devices**



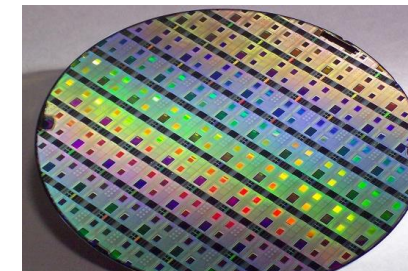
**Metals, Materials, Mining**



**Neuroscience**



**Railway Systems**



**Semiconductors**



**Software and Internet**

# Education / Student Competitions

Sponsored [44 competitions](#) and provided software to [2800 teams](#) in 2017

Fields include automotive, aerospace, biotech, programming, and robotics



**Headquarters**  
Natick, MA USA

**North America**  
United States

**Europe**  
France  
Germany  
Ireland  
Italy  
Netherlands  
Spain  
Sweden  
Switzerland  
UK

**Asia-Pacific**  
Australia  
China  
India  
Japan  
Korea

## MathWorks Today



**3 million+**  
**users**

in more than 180  
countries



**4000+**  
**staff**

in 31 offices around  
the world



**\$900+**  
**million**

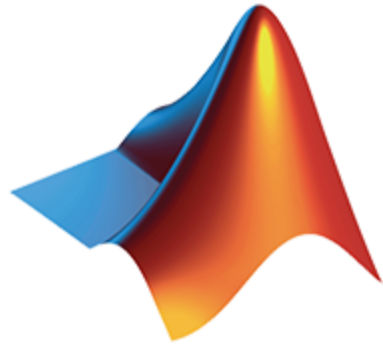
in 2017 revenues with  
60% from outside the US



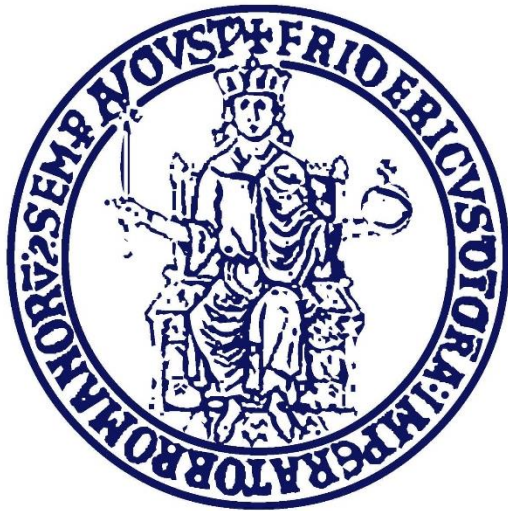
**Privately**  
**held**

and profitable every year





MathWorks®



UNIVERSITÀ DEGLI STUDI DI NAPOLI

FEDERICO II

# UniNa Campus License

- The University of Naples Federico II provides to student, teachers, researches and academics staff, a campus license for MATLAB and Simulink
- Instructions can be found at <http://www.csi.unina.it/matlab>
- MATLAB is also available as web-app: <https://matlab.mathworks.com/>
- You can also join the official Facebook group: <https://www.facebook.com/groups/572717553158419/>



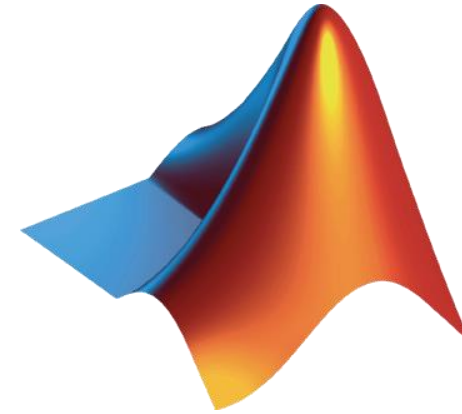
# Mathworks self-placed courses

- The campus license also provide access to self-placed on-line courses:  
<https://trainingenrollment.mathworks.com/selfEnrollment?code=QXEJ2NF8419>
  - › Solving Nonlinear Equations with MATLAB
  - › Solving Ordinary Differential Equations with MATLAB
  - › Introduction to Linear Algebra with MATLAB
  - › Introduction to Statistical Methods with MATLAB
  - › Deep Learning with MATLAB
  - › MATLAB Fundamentals
  - › MATLAB Programming Techniques
  - › MATLAB for Data Processing and Visualization
  - › Machine Learning with MATLAB
  - › MATLAB for Financial Applications

# Additional Resources

- There are also some freely available resources
- MATLAB Central:  
<https://www.mathworks.com/matlabcentral>
- Mathworks Academia:  
[https://www.mathworks.com/academia.html?s\\_tid=gn\\_acad](https://www.mathworks.com/academia.html?s_tid=gn_acad)
- Cody Problems:  
<https://www.mathworks.com/matlabcentral/cody>

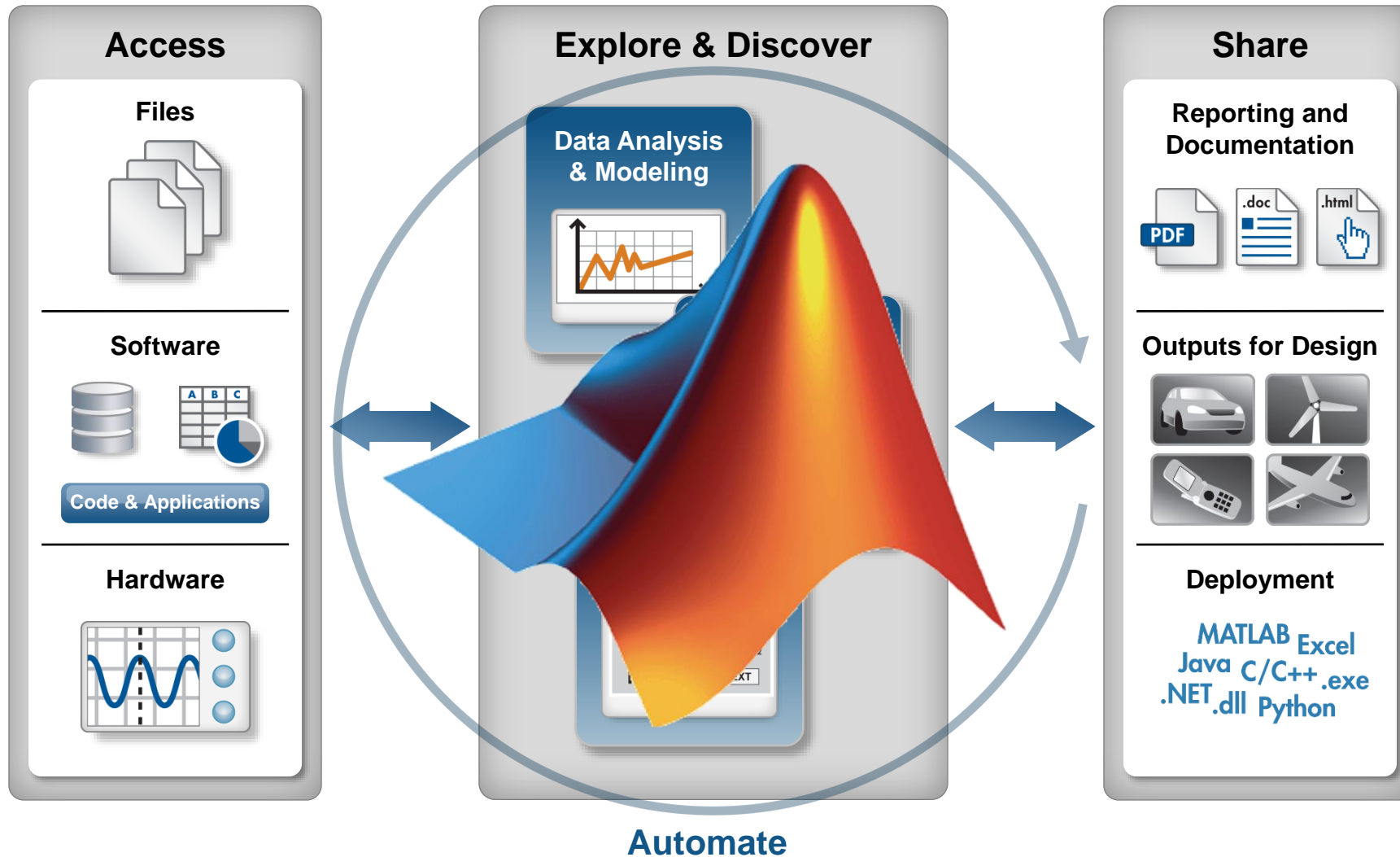
# Introduction to MATLAB: Hands-On Workshop



# Agenda

- Introduction to MATLAB environment
- Building analysis routines
- Creating reports/documentation
- Deploying applications
- Hands-on = play along with me!

# Data Analysis Workflow



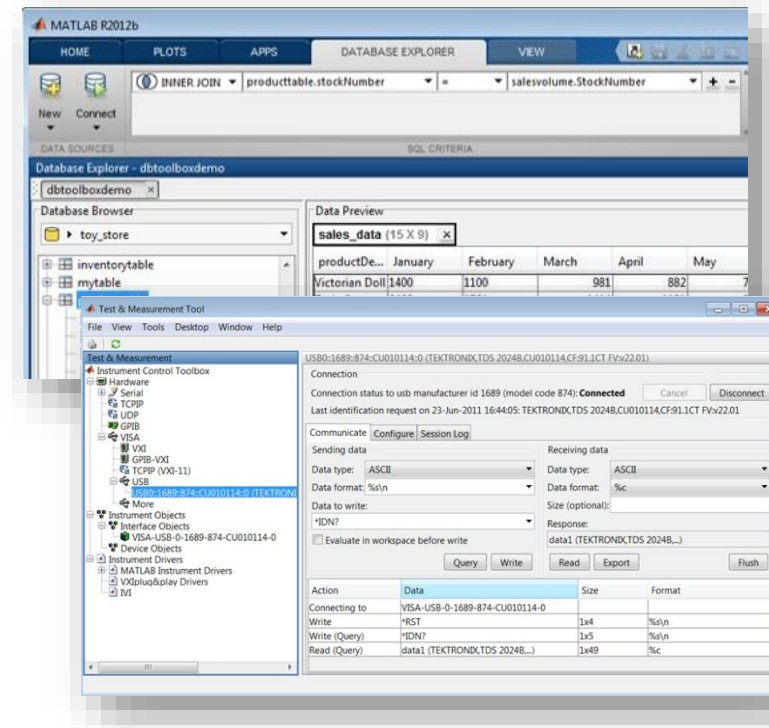
# Accessing Data from MATLAB

## Access

- Files
  - Excel, text, or binary
  - Audio and video, image
  - Scientific formats and XML
- Web Services
  - JSON, CSV, and image data
- Applications and languages
  - C/C++, Java, FORTRAN, Python
  - COM, .NET, shared libraries
  - Databases (*Database Toolbox*)
- Measurement hardware
  - Data acquisition hardware (*Data Acquisition Toolbox*)
  - Stand-alone instruments and devices (*Instrument Control Toolbox*)

## Explore & Discover

## Share





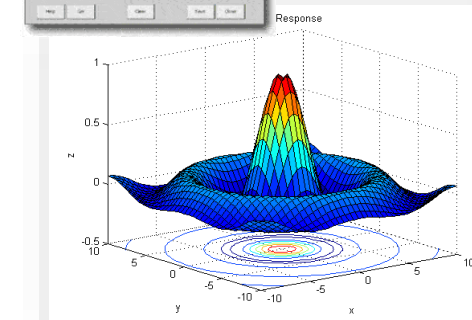
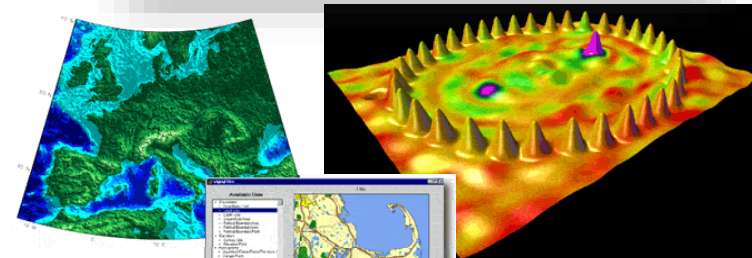
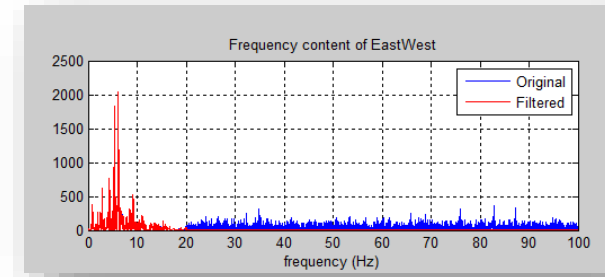
# Data Analysis and Visualization in MATLAB

Access

Explore & Discover

Share

- Data analysis
  - Manipulate, preprocess, and manage data
  - Fast, accurate analysis with pre-built math and engineering functions
- Visualization
  - Built in graphics functions for engineering and science (2D, 3D, volume visualization)
  - Interactive tools to annotate and customize graphics



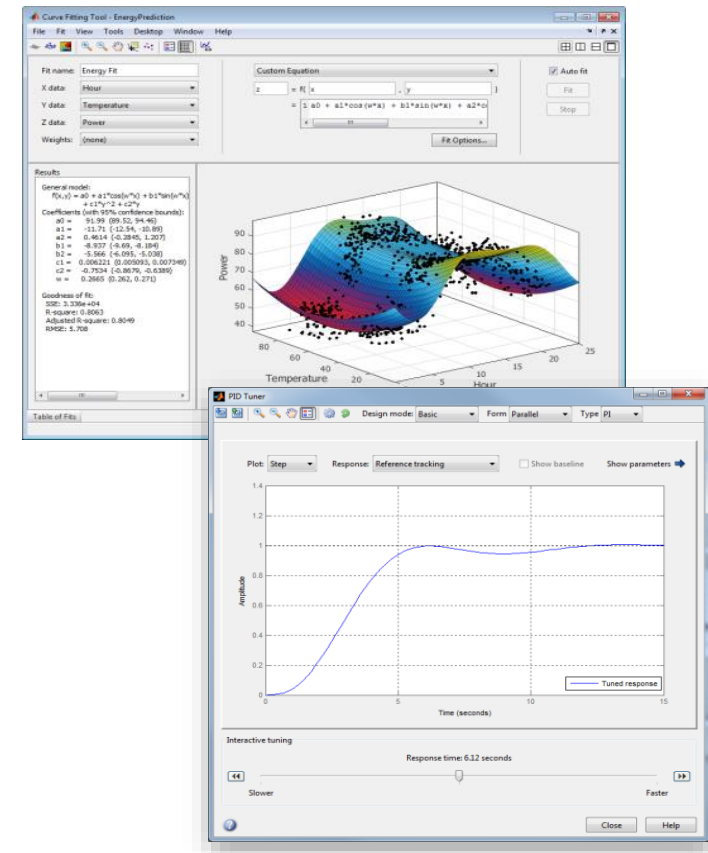
# Expanding the Capabilities of MATLAB

Access

Explore & Discover

Share

- MathWorks add-on tools for:
  - Math, statistics, and optimization
  - Control system design and analysis
  - Signal processing and communications
  - Image processing and computer vision
  - Parallel computing and more...
  
- Partner products provide:
  - Additional interfaces
  - Domain-specific analysis
  - Support for niche applications



# Sharing Results from MATLAB

Access

Explore & Discover

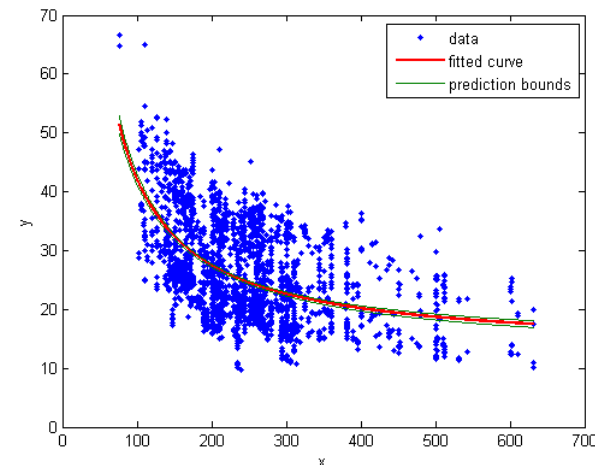
Share

- Automatically generate reports
  - Publish MATLAB files
  - Customize reports using MATLAB Report Generator
- Package as an app
- Deploy applications to other environments

## Plot Data and Model

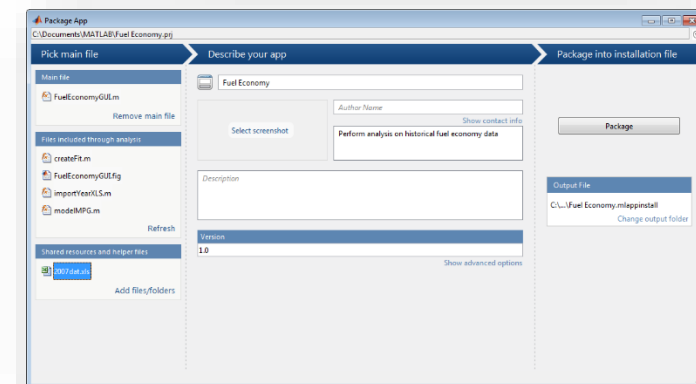
The result from the Curve Fitting Toolbox has a `plot` method for displaying the result graphically. We can choose to display the prediction bounds for the fit.

```
figure;  
hh = plot(cf, 'r', carDataDS.RatedHP, carDataDS.MPG, 'predfunc', 0.95);  
set(hh(2) , 'LineWidth', 2);  
set(hh(3:4), 'LineStyle', '--', 'Color', [0 .5 0]);
```



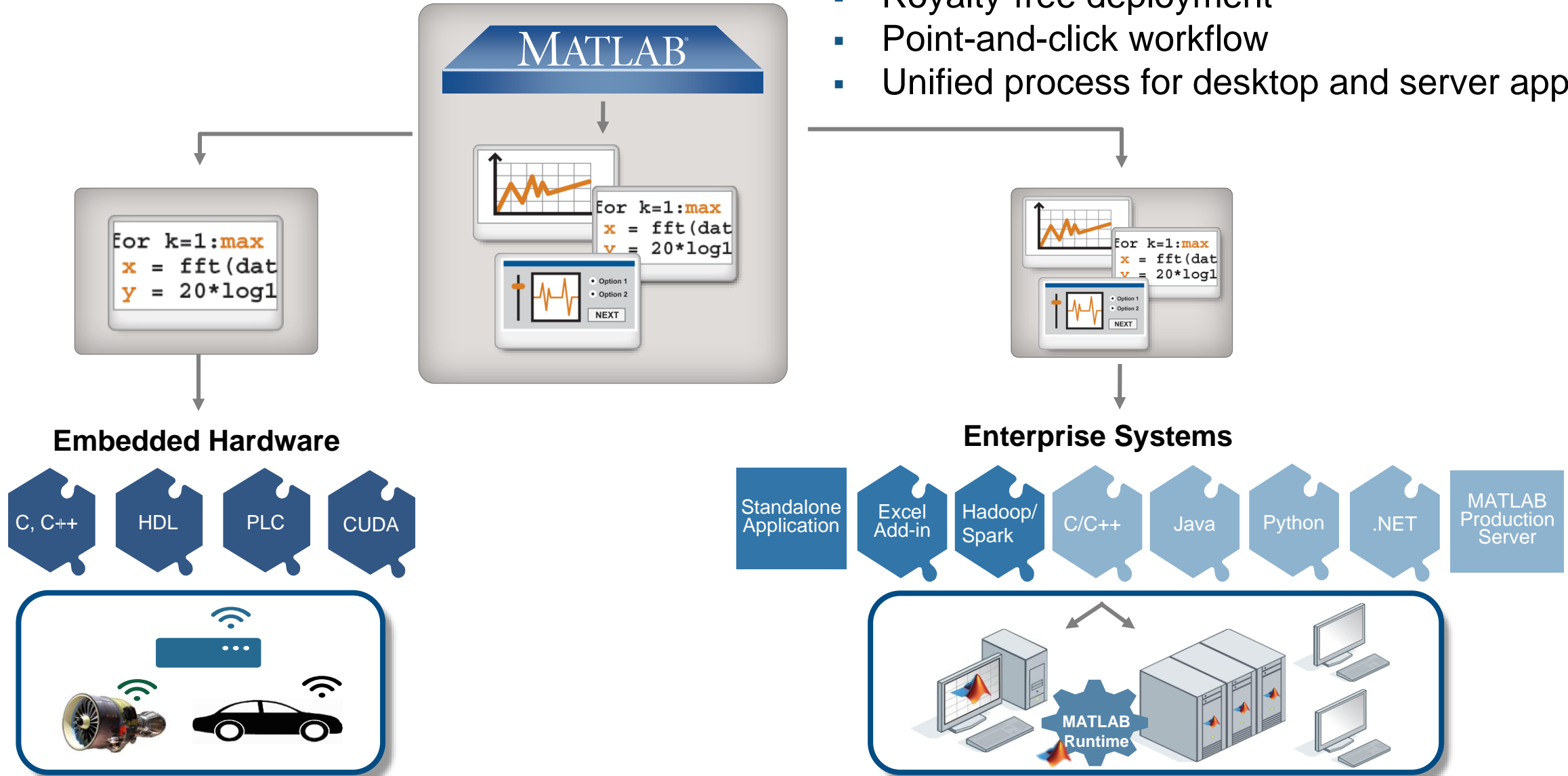
# Packaging and Sharing MATLAB Apps

- MATLAB apps
  - Interactive applications to perform technical computing tasks
  - Displayed in apps gallery
- Included in many MATLAB products
- Package your own app
  - Create single file for distribution and installation into gallery
  - Packaging tool:
    - Automatically includes all necessary files
    - Documents required products

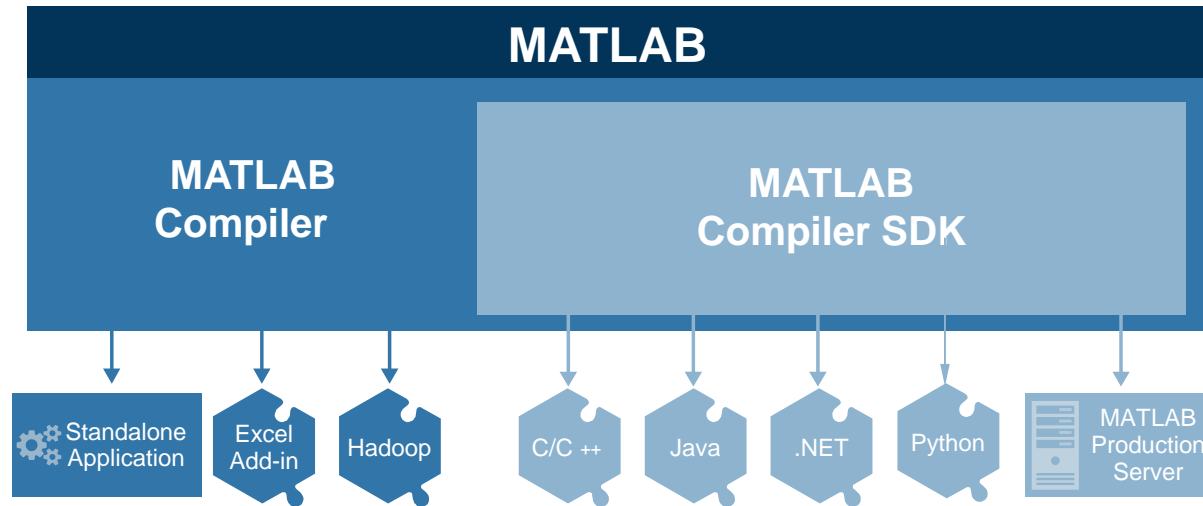


# Deployment Highlights

- Royalty-free deployment
- Point-and-click workflow
- Unified process for desktop and server apps



# MATLAB Application Deployment



**MATLAB Compiler** for sharing MATLAB programs without integration programming

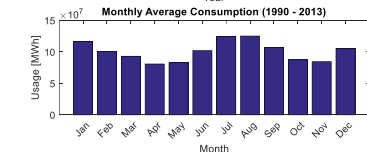
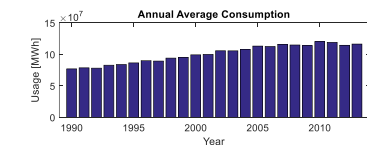
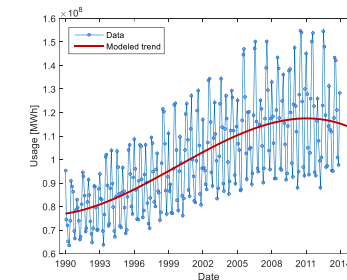
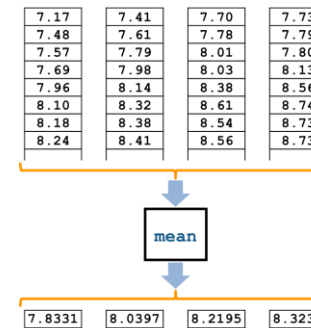
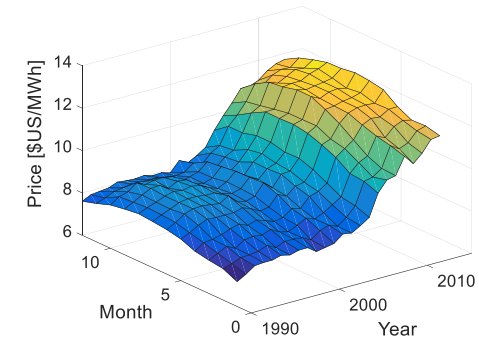
**MATLAB Compiler SDK** provides implementation and platform flexibility for software developers

**MATLAB Production Server** provides the most efficient development path for secure and scalable web and enterprise applications

# Training: *MATLAB Fundamentals*

After this course you will be able to:

- Import, analyze, and export data
- Write programs to automate complex tasks
- Perform calculations and analysis on data sets
- Create informative data visualizations





Learn more  
[mathworks.com](https://mathworks.com)

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