About MathWorks

Accelerating the Pace of Engineering and Science
We at MathWorks believe in the importance of engineers and scientists. They increase human knowledge and profoundly improve our standard of living.
We created MATLAB and Simulink to help them do their best work.
Create executable notebooks for sharing, presenting, teaching

Contextual hints while coding

View interactive outputs next to the code

Add rich text formatting, equations, images, and hyperlinks
Turn a script into a simple app

Add **interactive controls** to modify script variables
- Numeric sliders
- Drop-down lists
- Edit fields

Hide the code to create simple applications and dashboards
Complete steps interactively

Use tasks to explore parameters and options

Automatically generate MATLAB code for the completed task
Design decision logic at a higher level of abstraction

Graphically program, debug and execute state machines

Stateflow
Design decision logic at a higher level of abstraction – in MATLAB
Enable any engineer at any level to model any system

User interfaces
Enable any engineer at any level to model any system

User interfaces

Libraries
Enable any engineer at any level to model any system

User interfaces

Libraries

Systems engineering
Access and discover Simulink capabilities when you need them

User interfaces

Libraries

Systems engineering
Edit at the speed of thought

User interfaces

Libraries

Systems engineering
Edit at the speed of thought

User interfaces

Libraries

Systems engineering
Model deformations and contact between bodies

User interfaces

Libraries – Physical modeling

Systems engineering
Model fluid power and transport applications

User interfaces

Libraries – Physical modeling

Systems engineering
Model fluid power and transport applications

User interfaces

Libraries – Physical modeling

Systems engineering
Generate motor control software with just a few clicks

User interfaces

Libraries – Motor control

Systems engineering
Design and analyze complex system and software architectures

User interfaces

Libraries

Systems engineering

System Composer
Manage system complexity

Numerous Files

Team Collaboration

Environment Configuration
Manage system complexity with projects

**Projects** in MATLAB and Simulink help you to organize, manage, and share your code and models.
Explore file dependencies and impact analysis

Explore and visualize project structure
Explore file dependencies and impact analysis

Explore and visualize project structure

Assess how a change affects other files
Explore file dependencies and impact analysis

Explore and visualize project structure

Assess how a change affects other files

Find and fix problems
Explore file dependencies and impact analysis

Explore and visualize project structure

Assess how a change affects other files

Find and fix problems

Identify required products and toolboxes
Use source control systems (Git, Subversion) with projects
Access other languages and systems directly from MATLAB

**Python**

**C/C++**

**Java**

**Fortran**

COM components and ActiveX controls

RESTful, HTTP, and WSDL web services
Access other languages and systems directly from MATLAB

Access Python functions out-of-process

```matlab
pyenv("ExecutionMode","OutOfProcess")
wrapped = py.textwrap.wrap(T);
terminate(pyenv)
pyenv("Version","2.7");
py.list; % Reload interpreter
```

Call C++ libraries directly from MATLAB

```matlab
retVal = clib.libname.funcname(arg1, arg2, ...)
```
Simulink is the simulation integration platform
Simulink is the **simulation integration platform**

- C/C++
- OpenCV
- FMI/FMU
- IPG
- GT

Simulink
Test and verify your design

Review and analyze traceability between artifacts in one interface

Simulink Requirements
Test and verify your design

Review and analyze traceability between artifacts in one interface

Scope model coverage to requirements-based tests (RBT)
Test and verify your design

Review and analyze traceability between artifacts in one interface

Scope model coverage to requirements-based tests (RBT)

Use full physical RAM in target computer with the 64-bit real-time operating system
Use Jenkins servers to automatically run and test your project

Install MATLAB Plugin for Jenkins directly from the Jenkins Plugin Manager

This plugin integrates MATLAB (R) with Jenkins and provides Jenkins interface to run MATLAB and Simulink (R) tests.
Code verification using Polyspace

Desktop
Automate code verification using Polyspace
Automate code verification and share results using Polyspace

Desktop

Server Computer

Web Interface
Test and Verify
Share and Deploy

Deep Solutions
Share MATLAB apps as browser-based web apps

Create apps using App Designer and host them using MATLAB Web App Server
Share Simulink simulations – *where Simulink is not available*

Package a compiled Simulink model with MATLAB code
Deploy algorithms with automatically generated code

C++ classes from MATLAB classes

class MyClass
{
    public:
        MyClass *init();
        void publicMethod(double value);
        static double doubleThisValue(double val);
        double calculateSomeValue() const;
    private:
        MyClass *matlabCodegenHandle_init();
        MyClass *privateMethod(double value);
    public:
        double publicProp;
    private:
        double privateProp;
};
Deploy algorithms with automatically generated code

C++ classes from MATLAB classes

Code from software compositions with message-based communication

```cpp
class Sender: public ServiceA_If {
    public:
        step_10s() {
            ...
            // compute ack and send
            status = MSG.send(&ack);
        }
        ...
    private:
        ServiceB_IfProxy msgProxy;
        ...
};
```
Deploy algorithms with automatically generated code

C++ classes from MATLAB classes

Code from software compositions with message-based communication

Explore signal ranges in designs, and data type optimization

Fixed-Point Tool
Interactively access models, and develop and train networks
Interactively access models, and develop and train networks

Import pretrained networks for transfer learning

Deep Network Designer App
Interactively access models, and develop and train networks

Import pretrained networks for transfer learning

Train networks and generate MATLAB code

Deep Learning Toolbox
Manage multiple deep learning experiments

Keep track of training parameters

Reuse training data across multiple networks

Analyze and compare results

Experiment Manager App
Prototype and deploy deep learning networks on FPGAs and SoCs

- Run deep learning inferencing on FPGAs directly from MATLAB
- Use pre-built bitstreams for running on supported Xilinx and Intel devices
Deep Learning in Simulink

- Simulate and generate code using native blocks for support vector machine (SVM) models

- Generate, build, and deploy deep learning networks in Simulink models to NVIDIA GPUs

Simulink
Statistics and Machine Learning Toolbox
MATLAB Coder
GPU Coder
Robotics and Autonomous Systems

Perception → Planning → Control
Simulate and visualize robot kinematics
Design algorithms for planning and navigation

- Create a map of the environment
Design algorithms for planning and navigation

- Create a map of the environment
- Plan a path through a known map
Design, simulate, and deploy ROS-based applications

- ROS Nodes (Software)
- Simulators
- Hardware
- ROS ROS2
- ROS bags (Log files)
- Data analysis and playback
- Desktop prototyping
- Controls
- Perception
- Planning and decision making
- Standalone node deployment
Develop UAV applications and lidar processing systems

UAV Toolbox

Lidar Toolbox
Model, simulate, and test Wi-Fi 6 systems

Generate P802.11ax™ Draft 4.1 waveforms

Link-level simulation of 802.11ax Trigger-Based Format
Interactively generate 5G waveforms for testing
Start with reference examples to implement your design

Standards-based IP + Your expertise

Wireless HDL Toolbox

Your unique application

HDL Coder
Accelerate development of automated driving systems

Develop driving algorithms in a 3D simulation environment

Test algorithms with prebuilt scenarios
Accelerate development of automated driving systems

Develop driving algorithms in a 3D simulation environment

Test algorithms with prebuilt scenarios

Create driving scenarios using road data from high-definition maps
Accelerate development of automated driving systems
Accelerate development of automated driving systems

RoadRunner
Design 3D scenes for automated driving simulation

External Simulators

MATLAB & Simulink
Analyze fuel economy and performance for various architectures
Learn more about what’s new with blogs and release notes
Access and try the latest release with MATLAB Online
Access and try the latest release with MATLAB and Simulink Online
Access and try the latest release with MATLAB and Simulink Online
Get started and learn with Onramps

MATLAB Onramp

Simulink Onramp

Stateflow Onramp

Deep Learning Onramp

Machine Learning Onramp