Platform Productivity

Getting your work done faster

Workflow Depth

Support for your entire workflow

Application Breadth

Products for the work you do
- Create Your Designs Faster
- Simplify Analysis
- Execute Faster and Scale Your Work
- Collaborate
Create Your Designs Faster

- Embedded results – avoid context switching
- Contextual hints - both for variables and available options for functions
- Interactive MATLAB code generation
- Tell a story – title, images, hyperlinks
Create Your Designs Faster
- Simplify Analysis with Apps

Interactive tools to speed up prototyping

- For signal data, machine learning, image labeling, and much more

- New Apps:
  - Econometric Modeler app
  - Analog Input Recorder app
  - Wavelet Signal Denoiser app
Create Your Designs Faster

MATLAB

App Designer
Create Your Designs Faster

MATLAB

Simulink
Create Your Designs Faster

MATLAB

Simulink

Stateflow
Simplify Analysis by Simulating at Wall Clock Speed

Slow down the simulation for easier model interactivity

- Especially for models controlled and monitored via Dashboard blocks and other displays
- Useful when model is connected to hardware
Scale Your Work

Use parallel computing to run multiple simulations faster

- Run multiple parallel simulations with **parsim**
- Monitor simulation status and progress in the Simulation Manager
Scale Your Work

Use tall arrays to manipulate and analyze data that is too big to fit in memory

- Use familiar MATLAB functions and syntax
- Support for hundreds of functions
- Works with Spark + Hadoop clusters
Execute Faster

Redesigned execution engine runs MATLAB code faster

- All MATLAB code can now be JIT compiled
- MATLAB runs your code over twice as fast as it did just three years ago
- No need to change a single line of your code
- Increased speed of MATLAB startup in R2018a
Team Collaboration

Diff and Merge to support team collaboration
Upgrade your MATLAB Code and Simulink Models
▪ Create Your Designs Faster
▪ Simplify Analysis
▪ Execute Faster and Scale Your Work
▪ Collaborate
- Code Generation from Simulink Models
- Verification and Validation
Prepare Your Model for Code Generation

Prepare model components for code generation
Prepare Your Model for Code Generation

Prepare model components for code generation

Prepare model data for code generation
Code Generation Workflow and Improvements

Access and define all the information in your model related to code generation

- View and define implementation data in one place
- View implementation details without model details
- Improve code performance and ease integration with other C code

Row-major memory layout option
Deploying to FPGA or ASIC Hardware

- Algorithm
- Algorithm w/ Hardware Implementation
- HDL Verifier
- HDL Coder
- Fixed-Point HDL
- FPGA/ASIC Implementation

Native Floating Point

- 1/sqrt(3) to single
- Alpha_Gain

Matrix Support

- Matrix Multiply
- Matrix

Vision HDL Toolbox

- Image: Edge, Ctrl, Sobel, Th

LTE HDL Toolbox

- Image: LTE Turbo Decoder, Ctrl

HDL Checks in Model Advisor

- HDL Coder
- Check for safe model parameters
- Check for global reset setting for Xilinx and Altera devices
- Check for configuration settings
- Check for visualization settings
- Check for delay balancing settings
- Check for algebraic loops
- Native Floating Point

MATLAB EXPO 2018
Verification and Validation

Products for the entire workflow

Simulink Requirements
- Implemented
- Verified

Simulink Design Verifier

Simulink Coverage
- Simulation
- HIL
- Certification

Simulink Check
- Property proving
- Standards checks
- Code verification

Simulink Test
- Test generation

Polyspace
- Code inspection

now supports AUTOSAR

MATLAB EXPO 2018
- Code Generation from Simulink Models
- Verification and Validation
Autonomous Systems
Wireless Communications
Artificial Intelligence (AI)
Designing Autonomous Systems

Perceive → Sense → Decide & Plan → Act
Designing Autonomous Systems

Mapping of environments using sensor data

- Segment and register lidar point clouds
- Lidar-Based SLAM: Localize robots and build map environments using lidar sensors
Designing Autonomous Systems

Understanding the environment using computer vision and deep learning techniques

- Object detection and tracking
- Semantic segmentation using deep learning

Designing Autonomous Systems

Design synthetic driving scenarios to test controllers and sensor fusion algorithms

- Interactively design synthetic driving scenarios composed of roads and actors (*vehicles, pedestrians, etc.*)
- Generate visual and radar detections of actors
Designing Autonomous Systems

Model predictive control for adaptive cruise control and lane-keeping algorithms

- Use prebuilt blocks instead of starting from scratch
- Simplified application-specific interfaces for configuring model predictive controllers
- Flexibility to customize for your application
Full Vehicle Simulation

Ride & handling

Chassis controls

Automated Driving

Perceive

Decide & Plan

Sense

Act
Design with the Latest Wireless Standards

- LTE
- 5G
- Wi-Fi 802.11ax
- ZigBee
- NB-IoT
Artificial Intelligence

Data → COMPUTER → Model → Output
Predictive Maintenance

Data

Sensors

Model

Remaining Useful Life (RUL) Estimation

Failure Threshold

RUL ~ 9.5 days

Real Data

Prediction

Normal Operation

Monitor Closely

Maintenance Needed
Predictive Maintenance

Design and test condition monitoring and predictive maintenance algorithms

- Import sensor data from local files and cloud storage (Amazon S3, Windows Azure Blob Storage, and Hadoop HDFS)
- Use simulated failure data from Simulink models
- Get started with examples (motors, gearboxes, batteries, and other machines)
Deep Learning
Deep Learning

Design, build, and visualize neural networks

- Access the latest models
- Import pretrained models and use transfer learning
- Automate ground-truth labeling using apps
- Design and build your own models
- Use NVIDIA GPUs to train your models
- Automatically generate high-performance CUDA code for embedded deployment
FREE

Learn to Use MATLAB for Deep Learning in 2 Hours

Launch Deep Learning Onramp
What’s New in MATLAB and Simulink?

Platform Productivity
- Design Creation
- Analysis
- Simulation, Scaling
- Collaboration

Workflow Depth
- Code Generation
- Verification and Validation

Application Breadth
- Autonomous Systems
- Wireless Communications
- Artificial Intelligence (AI)