MATLAB and Simulink最新情報

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R2016a  R2016b
Latest Releases of MATLAB and Simulink

R2016a  R2016b
Analysis and Visualization

Modeling and Simulation

Testing and Verification

Sharing and Collaboration

Performance
Working with data just got easier.

- New functionality to **store and manage** data
  - **timetable** data container
    - Store time-stamped tabular data
    - Reorganize, evenly space, and align data
  - **string** arrays
    - Memory efficient, faster string operations
    - New functions for common string manipulation

- New capabilities for **preprocessing** data
  - Find, fill, and remove missing data
  - Options to ignore “NaNs” with cumulative statistic functions
  - **discretize** function now works on **datetime** and **duration** data types
Working with big data just got easier.

**tall arrays ➔ New data type in MATLAB**

- Handle data **too big to fit into memory**
- Statistical and machine learning applications
  - Hundreds of functions supported in MATLAB and Statistics and Machine Learning Toolbox
- Works with Spark + Hadoop Clusters
MATLAB Live Editor

Change the way you work in MATLAB

- Accelerating exploratory programming and analysis
- Add equations, images, hyperlinks, and formatted text to create interactive narratives
- Create lectures that combine explanatory text, mathematical equations, code and results
One-Click Display

Click a signal line when the simulation is running to view the current value

- Display port value for a signal by clicking it during simulation for easy debugging

- For bus signals, select the signals of interest before simulation

Analysis and Visualization
Logic Analyzer

Visualize, measure, and analyze transitions and states over time for Simulink signals

- Easily trace signal values over time for multiple signals
- View digital and analog signals together
Apps Simplify Modeling and Simulation

- **Signal Analyzer app**
  *Signal Processing Toolbox*
  – Perform time- and frequency-domain analysis of multiple time series

- **Classification Learner app**
  *Statistics and Machine Learning Toolbox*
  – Train models to classify data using supervised machine learning

- **Control System Designer app**
  *Control System Toolbox*
  – Design single-input, single-output (SISO) controllers
Pause Button

Troubleshoot problems without specifying breakpoints in advance

- Pause the execution of a program from the Editor and enter debug mode
- Check on the progress of long running programs to ensure they are running as expected
- Resume program execution
Automatic Solver Option

Set up and simulate your model more quickly with automatically selected solver settings

- Simulink will select a solver and step size that is optimized for your specific model
- Considers factors such as model stiffness and simulation performance
- Can optionally lock down solver so that it does not change from one simulation to another
Streamlined editing of parameters and data

Reduces the need to open separate dialog boxes

- Model and block parameter data is now accessible within the main editor window
- Accessing and defining Stateflow data is also much easier
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Performance
Simulink Units

Specify, visualize, and check consistency of units on interfaces

- Specify physical units for Simulink signals and bus elements at the interfaces of components
- Identify unit mismatches at the component interfaces
Edit-Time Checking

Detect and fix standards compliance issues at design time

- Quickly address compliance and modeling standards issues
- Identify and fix at edit time
- Especially useful for applications that require compliance to standards such as DO-178, ISO 26262, IEC 62304
Cyber Security Code Verification

Identify CERT C violations using defect checkers and coding rules

- With rise in connectivity of embedded systems:
  - Growing concern over software security
  - Security compromises safety of critical systems

- Polyspace® Bug Finder™ can detect security vulnerabilities highlighted by the CERT C standard
Analysis and Visualization

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Performance

Sharing and Collaboration
Collaborative Development

Access shared templates and resolve conflicts between revisions of model files

- Create new Simulink models using templates as starting points
- Resolve conflicts in model files under source control
- Interactive comparison report with the two conflicting designs
Enhanced design environment and expanded UI component set

- New components with gauges, lamps, knobs and switches
- Quickly move between visual design and code development
- New object-based code format makes it easier to share data between parts of the app
Analysis and Visualization

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Performance
MATLAB Execution Engine

Redesigned execution engine runs MATLAB code faster

- All MATLAB code can now be JIT compiled
- Average performance improvement of 40% on 76 performance-sensitive user applications
- A platform for future improvements

Comparing R2016b to R2015a
(R2015a was the release before the new execution engine was delivered)
73% of benchmarks appreciably faster
Faster Simulation Builds and Runs

Quickly build the top-level model when running simulations in Accelerator mode

- Simulink now generates an execution engine in memory instead of generating code before running simulations in Accelerator mode
- Simulations run in Accelerator mode now start up much faster
- Simscape simulations run up to 5x faster
Notable Features and New Products
Neural Network / Deep Learning
Auto-Encoder, RNN, CNN, R-CNN

Convolutional Neural Network (CNN)

Regional Convolutional Neural Network (R-CNN)

Notable Features and New Products
Audio System Toolbox and WLAN System Toolbox

Design and test audio processing and WLAN (WiFi) Systems

- Audio System Toolbox enables real-time audio processing in MATLAB and Simulink
- WLAN System Toolbox enables design and verification of evolving WLAN systems and WiFi devices
- Use together with LTE System Toolbox to design and test wireless systems

Notable Features and New Products
Robotics System Toolbox

ROS Node Communication
- Automated C++ ROS Node Deployment
- ROS action support

Mobile Robotics Algorithms
- Robot Localization, Occupancy Grid
- Path Planning, Obstacle Avoidance

Manipulator Robotics Support
- Tree-Structured Robot
- Inverse kinematics analysis
**ThingSpeak**

**Collect**
- Send sensor data to the cloud

**Analyze**
- Analyze and visualize your data with MATLAB

**Act**
- Trigger a reaction

**New in R2016b; use functions from:**
- Statistics and Machine Learning Toolbox
- Signal Processing Toolbox
- Curve Fitting Toolbox
- Mapping Toolbox

Notable Features and New Products
Hardware Support

- Run Simulink models on Raspberry Pi 3 and Google Nexus
- Communicate with Raspberry Pi 3 and Raspberry Pi Sense HAT hardware directly from MATLAB
- Log data from iPhone and Android device sensors directly to the cloud with MATLAB Mobile
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