What’s New – MATLAB and Simulink

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What was new for Simulink in R2012b?

Discover the new look and feel of Simulink

With Simulink® Release 2012b, it's even easier to build, manage, and navigate your Simulink and Stateflow® models:

- Smart line routing
- Tabbed model windows
- Simulation rewind
- Signal breakpoints
- Explorer bar
- Subsystem and signal badges
- Project management
What was new for MATLAB in R2012b?

The New
MATLAB Desktop

See what you’ve been missing.

R2012b introduces a fresh new MATLAB® Desktop, making it easier to find what you need.

Toolstrip
Highlights commonly used functionality

Apps Gallery
Displays in-product and user-written apps

Online Documentation and Redesigned Help
Improves searching, browsing, and filtering

TRY IT TODAY
visit mathworks.com/matlab-new-features
New MATLAB Graphics System

MATLAB R2024b includes a major update to the MATLAB graphics system, with a new look and many new features. Some existing code may need to be revised to work in this version of MATLAB.
Simulink – Better Simulation Data Analysis
New Simulation Data Inspector
Stateflow – Watch Data
Simulink – Accelerate Model Building
Smart Editing Cues
Simulink – Comment Out / Through

Comment a block so that the output equals the input

- Signal passes through the block during simulation
- Comment out option remains available
- Works on blocks with the same number of inputs and outputs
Simulink – Model Templates

Build models using design patterns that serve as starting points to solve common problems

- Use shipped templates to get started with building models or create custom templates to from a Simulink model
- Avoid repetitive tasks when starting out to build a new model
- Enforce a standard process for building models for the entire team or organization
MATLAB
Tables

- **table** – new fundamental data type
- For mixed-type tabular data
  - Holds both data and metadata
- Supports flexible indexing
- Built-in functionality (merge, sort, etc.)
MATLAB Categorical Arrays

- **categorical** – new fundamental data type

- For discrete non-numeric data
  - Values drawn from a finite set of possible values ("categories")

- More memory efficient than a cell array of strings

- Can be compared using logical operators
  - Similar to numeric arrays
MATLAB Date and Time Arrays

- `datetime` for representing a point in time
- `duration`, `calendarDuration` for representing elapsed time

- Same data type for computation and display
  - Add, subtract, sort, compare, and plot
  - Customize display formats
  - Nanosecond precision

- Support for time zones
  - Accounts for daylight saving time
Import Tool

- Interactive import of delimited and fixed-width text files

- Improved handling of:
  - Numbers
  - Text
  - Dates

- Define rules for handling nonnumeric values

- Automatically generate MATLAB code (scripts and functions) to automate the process
Additional Support for Importing Data

- Access online data (webread)
  - JSON, CSV, and image data

- Faster data import from text files

- Import data directly as **categorical** or **datetime** arrays

- Read and write data from network-connected devices (**tcpclient**)
Connecting to Low Cost Hardware

Engineer’s computer
- MATLAB algorithm or Simulink model

Data I/O
- Ethernet / USB / Bluetooth
- MATLAB Hardware Support Packages

Target
- Simulink Hardware Support Packages

Low Cost Hardware
- Android Sensors
- Lego EV3
- Arduino
- Raspberry Pi
- Webcam

Get Support Package Now
Simulink – Performance Advisor
Simulink - Faster consecutive simulations

Fast Restart
Solving Bigger Problems with MATLAB

- Problems that **take too long** for one processor to solve
  - Growing toolbox support (parallel and GPU)
    - Image Processing Toolbox (13a,14a)
    - Signal Processing Toolbox (12b)
    - Neural Network Toolbox (12b)
    - Phased Array System Toolbox (12b)
  - Expanding supported functions for GPUs (200+ functions)

- Problems with **data that is too big** for a desktop computer
Big Data Capabilities in MATLAB

Memory and Data Access
- 64-bit processors
- Memory Mapped Variables
- Disk Variables
- Databases
- **Datastores**

Programming Constructs
- Streaming
- Block Processing
- Parallel-for loops
- GPU Arrays
- SPMD and Distributed Arrays
- **MapReduce**

Platforms
- Desktop (Multicore, GPU)
- Clusters
- Cloud Computing (MDCS on EC2)
- **Hadoop**
Simulink – Data Dictionary

Store, edit and access design data using the data dictionary

- Change tracking and differencing
- Defined relationship with SLDD file
- Componentization
- Scalability and performance
- Integration with Simulink Projects
Simulink – View and trace input/output signals

Interface Display
Simulink – Save graphical views of model

Viewmarks
Simulink – Variant Manager

Create and validate variant configurations

- Visualize and explore variant hierarchies (including model variants)
- Create and validate variant configurations for automation
- Also accessible through Command-line API
Simulink – Annotation Connectors

Associate annotations with blocks in models

- Quickly switch between an annotation-free model
- One click way to turn off and on annotations in the model
- Enable the feature to specific annotations
  Ex: review comments
Simulink Projects

Find, manage, and share all the required files of your projects

- Includes impact analysis, dependency analysis, category labels, templates
- Identify file dependencies at an individual block-level R2014b
- Connects to Subversion and Git
Source Control Integration

- Manage your code from within the MATLAB Desktop and your models from within Simulink Projects
- Leverage modern source control capabilities
  - GIT and Subversion integration in Current Folder browser
- Use Comparison Tool to view and merge changes between revisions
Toolbox Packaging
Questions?