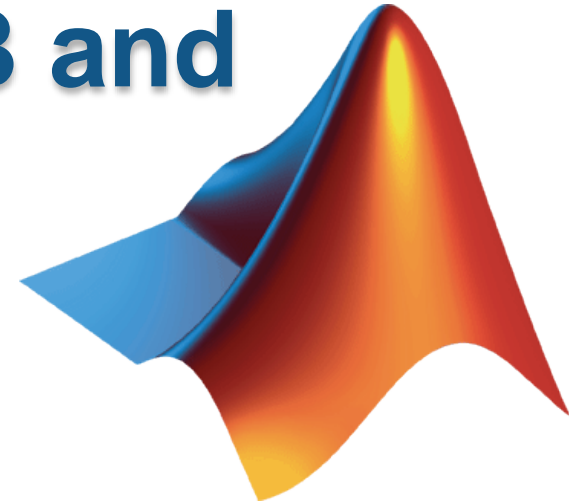


What's New in MATLAB and Simulink



Prashant Rao
Technical Manager
MathWorks India

MathWorks Product Overview

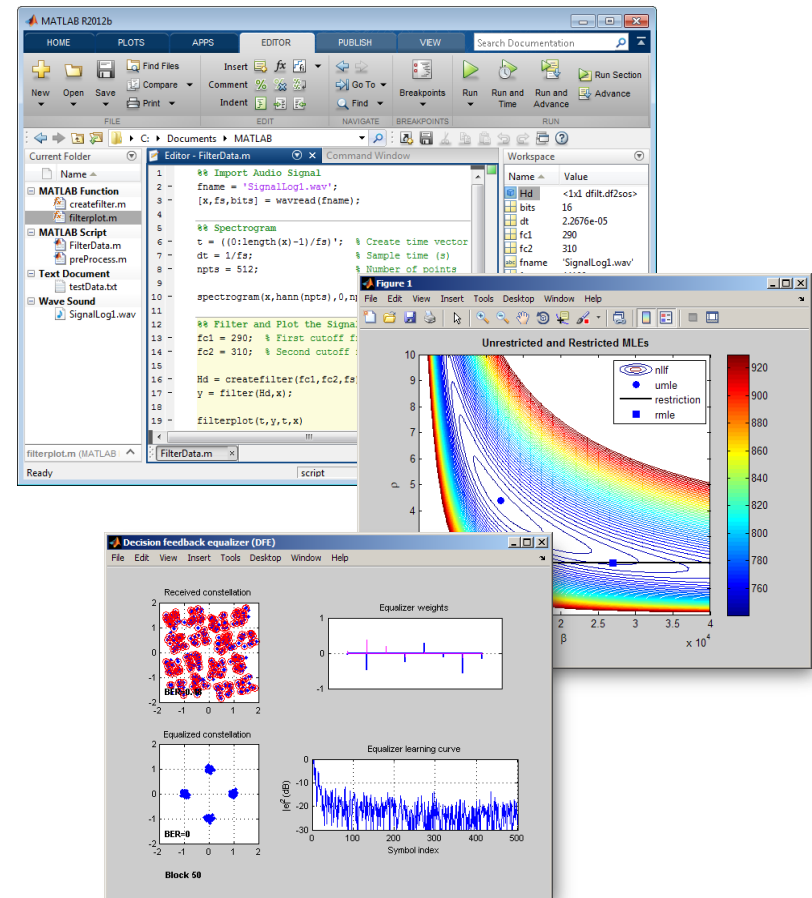


Core MathWorks Products

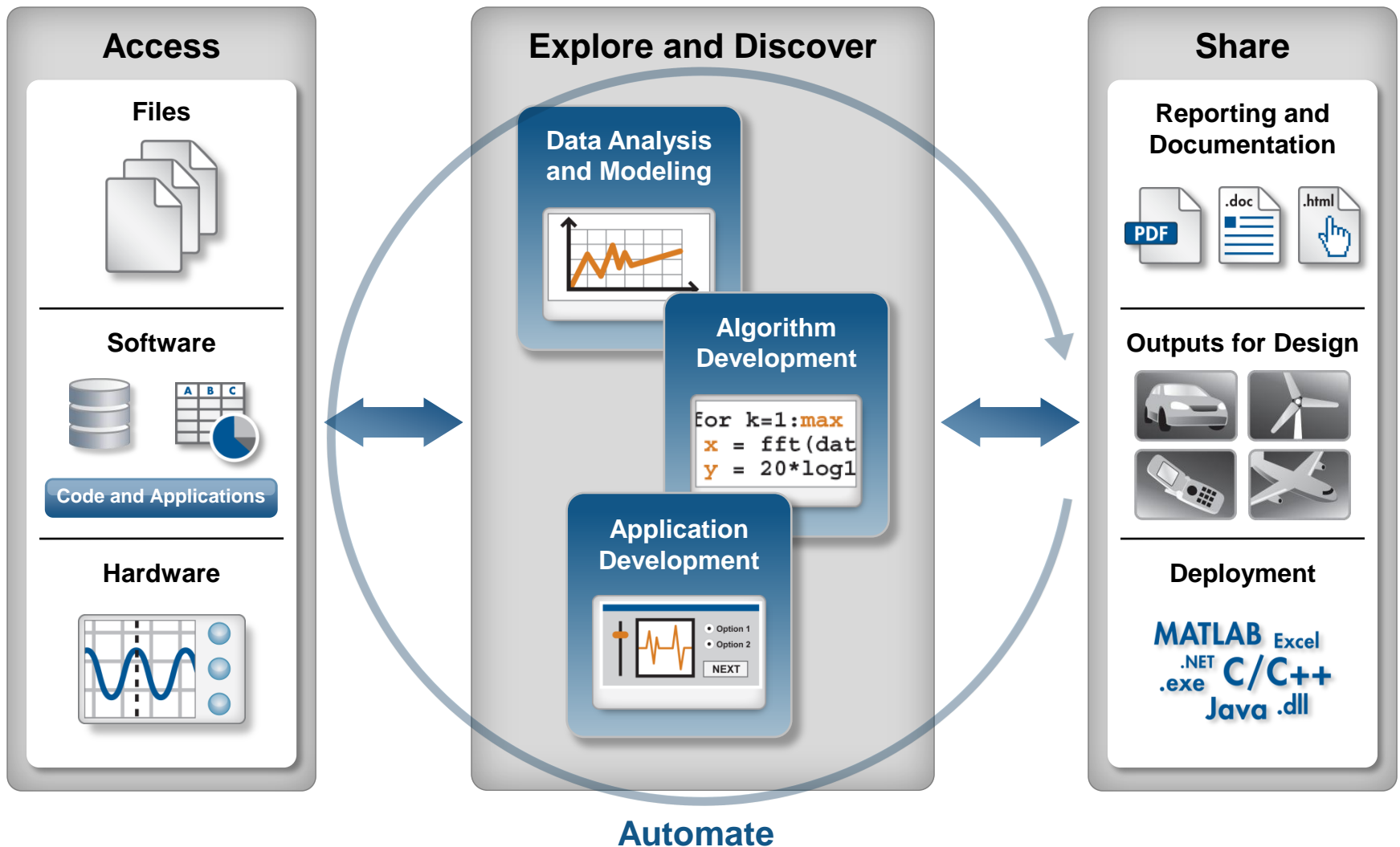
MATLAB®

The leading environment for technical computing

- The industry-standard, high-level programming language for algorithm development
- Numeric computation
- Parallel computing, with multicore and multiprocessor support
- Data analysis and visualization
- Toolboxes for signal and image processing, statistics, optimization, symbolic math, and other areas
- Tools for application development and deployment
- Foundation of MathWorks products



Technical Computing Workflow

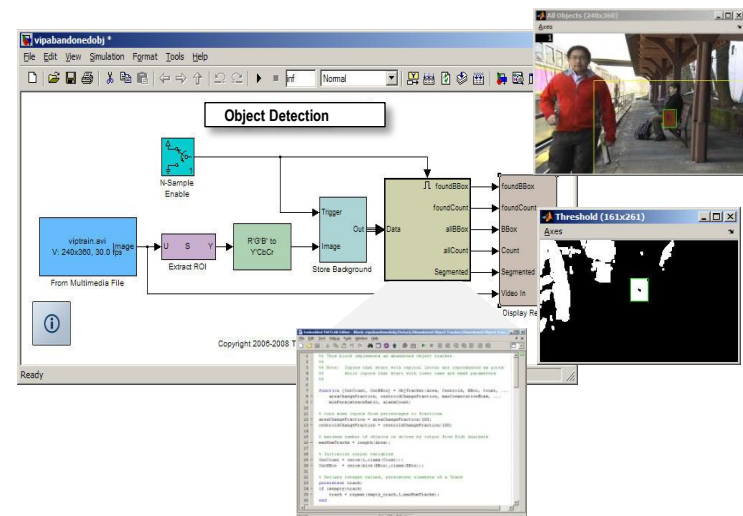
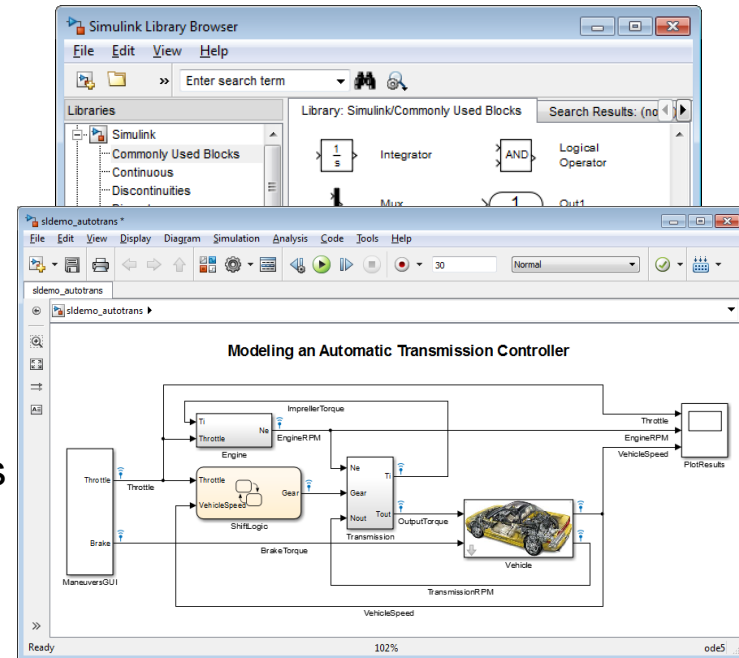


Core MathWorks Products

SIMULINK®

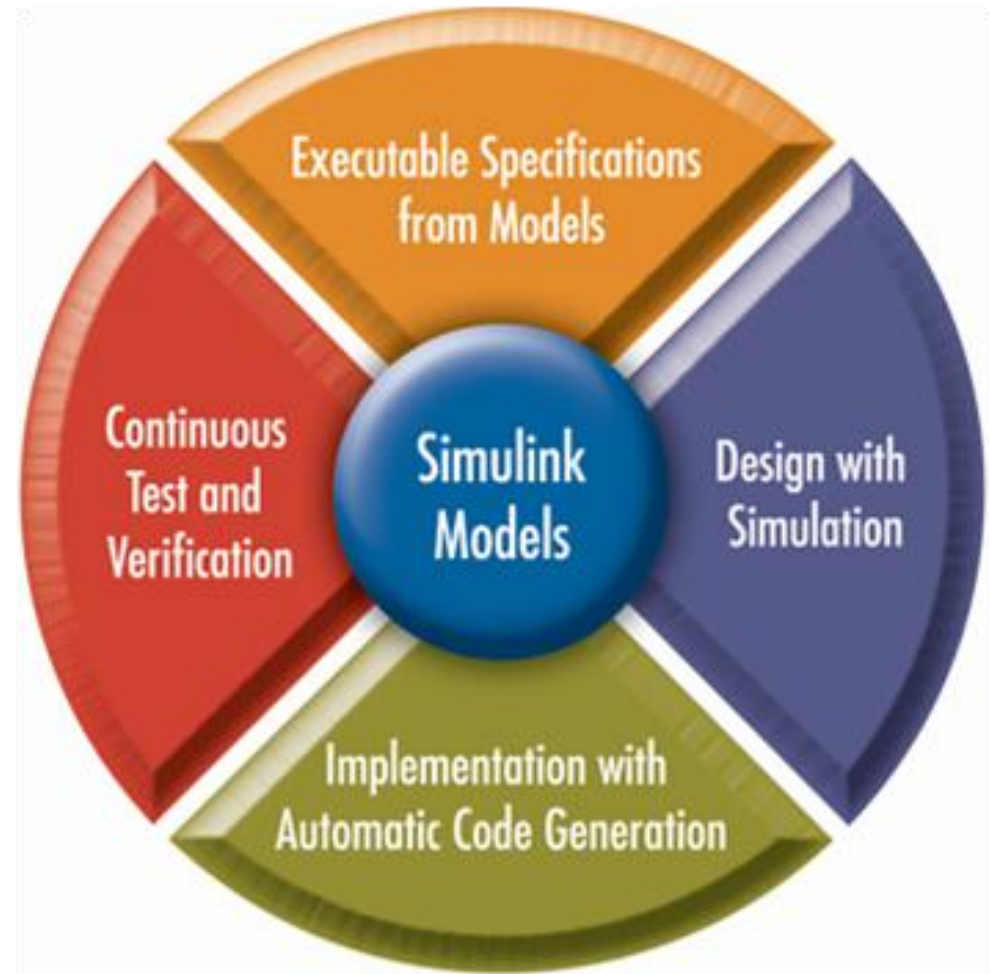
The leading environment for system-level modeling, simulation, and verification

- Block-diagram environment
- Model, simulate, and analyze multi-domain systems
- Design, implement, and test:
 - Control systems
 - Signal processing systems
 - Communications systems
 - Other dynamic systems
- Platform for Model-Based Design



Model-Based Design: Benefits

- **Cost**
 - Minimize prototypes and rework
 - Facilitates design reuse
- **Schedule**
 - Shortens time-to-market
 - Enhances team communication
- **Performance**
 - Fosters innovation
 - Improves quality



Release 2012b Highlights

MATLAB

Introducing the new MATLAB Desktop:
making it easier to find what you need.

The New
MATLAB Desktop

See what you've
been missing.

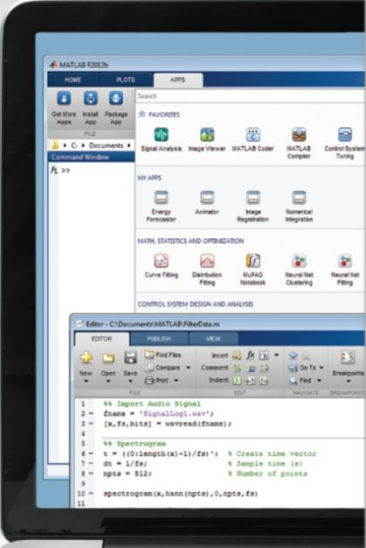
TRY IT TODAY
visit mathworks.com/matlab-new-features

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



Simulink

Introducing the new Simulink Editor:
making it easier to build, manage,
navigate and simulate your models.

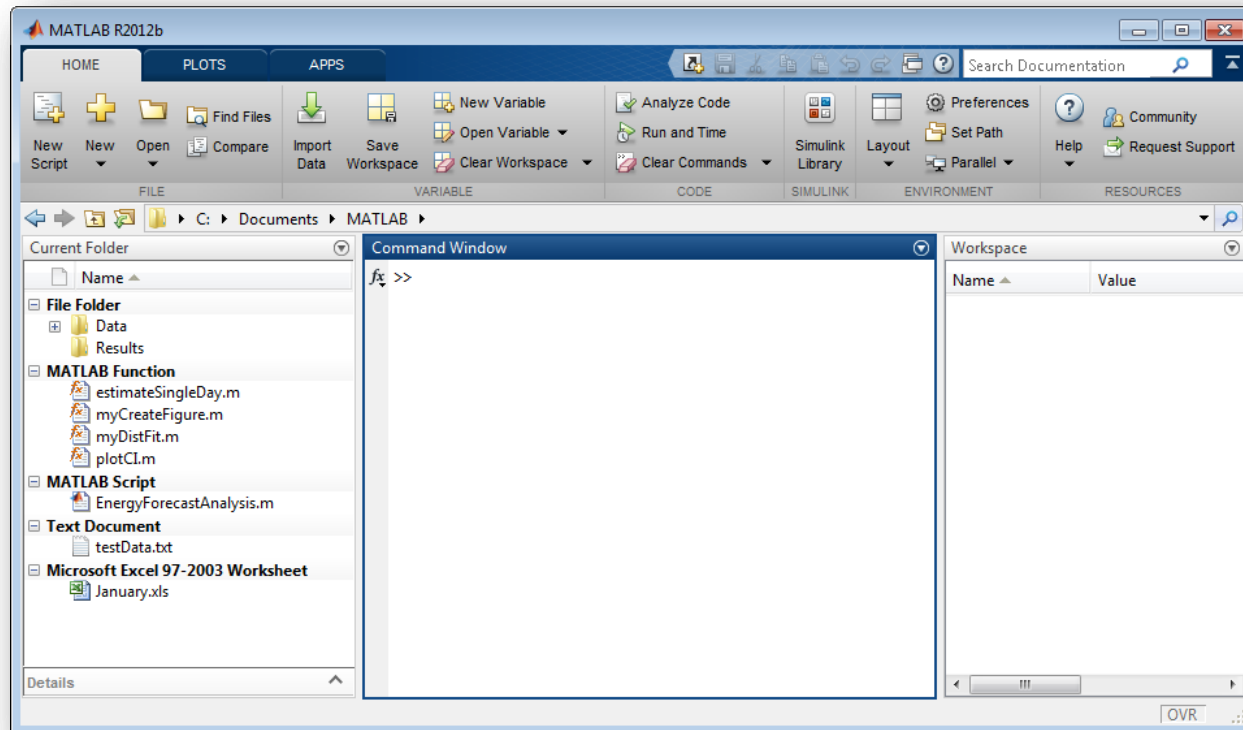
**DISCOVER
THE NEW
LOOK AND FEEL
of
Simulink**

TRY IT TODAY
visit mathworks.com

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



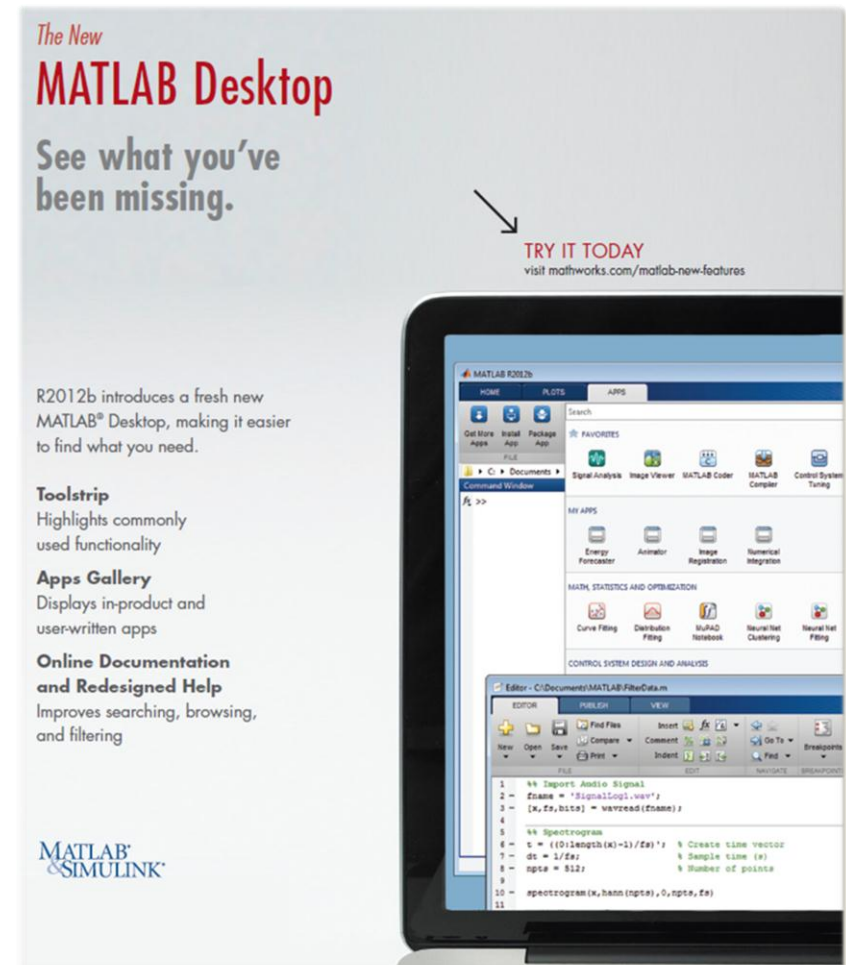


MATLAB

Introducing the New MATLAB Desktop

What's New in MATLAB?

- MATLAB Toolstrip
- MATLAB apps
- Import Tool
- Command line suggestions
- Help System

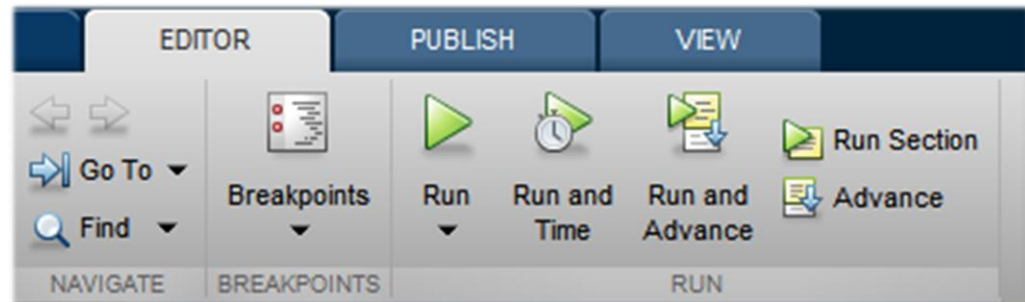
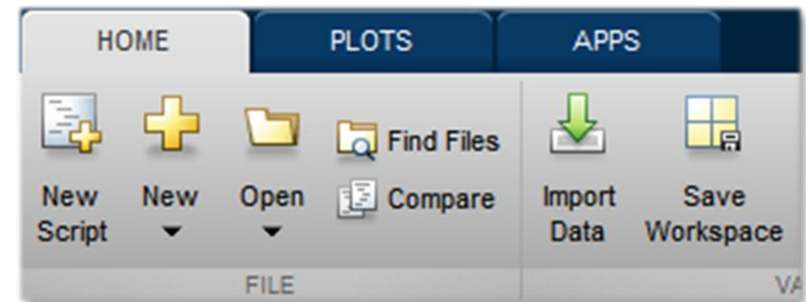


MATLAB Toolstrip

Find what you need

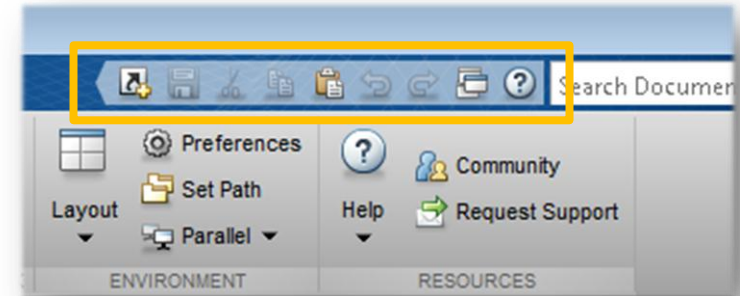
- Tabs organize commonly used functionality
 - Key features placed up front
 - Design optimized for common tasks

- Functionality only appears when needed



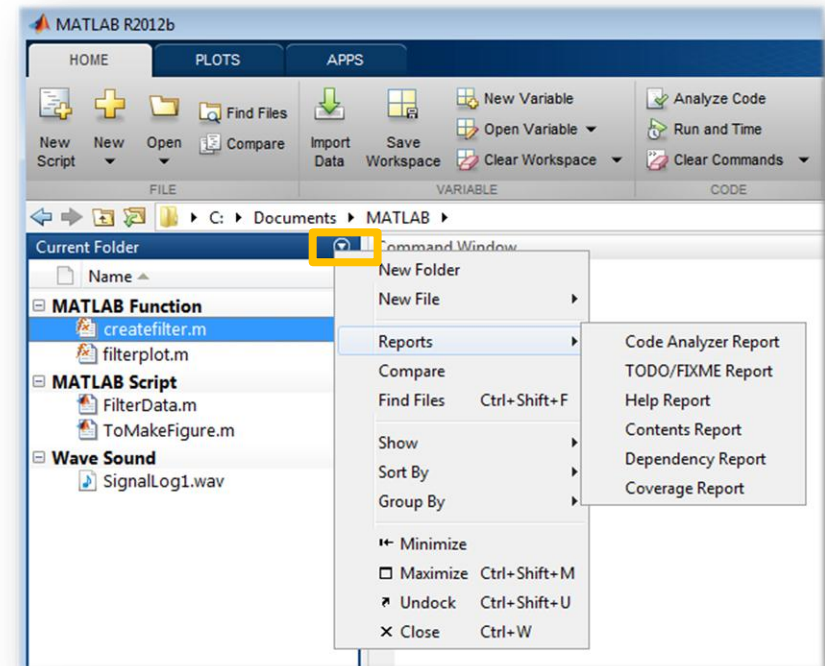
Quick Access Toolbar

- Place to put commonly used commands
- Any item from a tab or shortcuts can be added to the toolbar
- Remains visible when the toolstrip is minimized



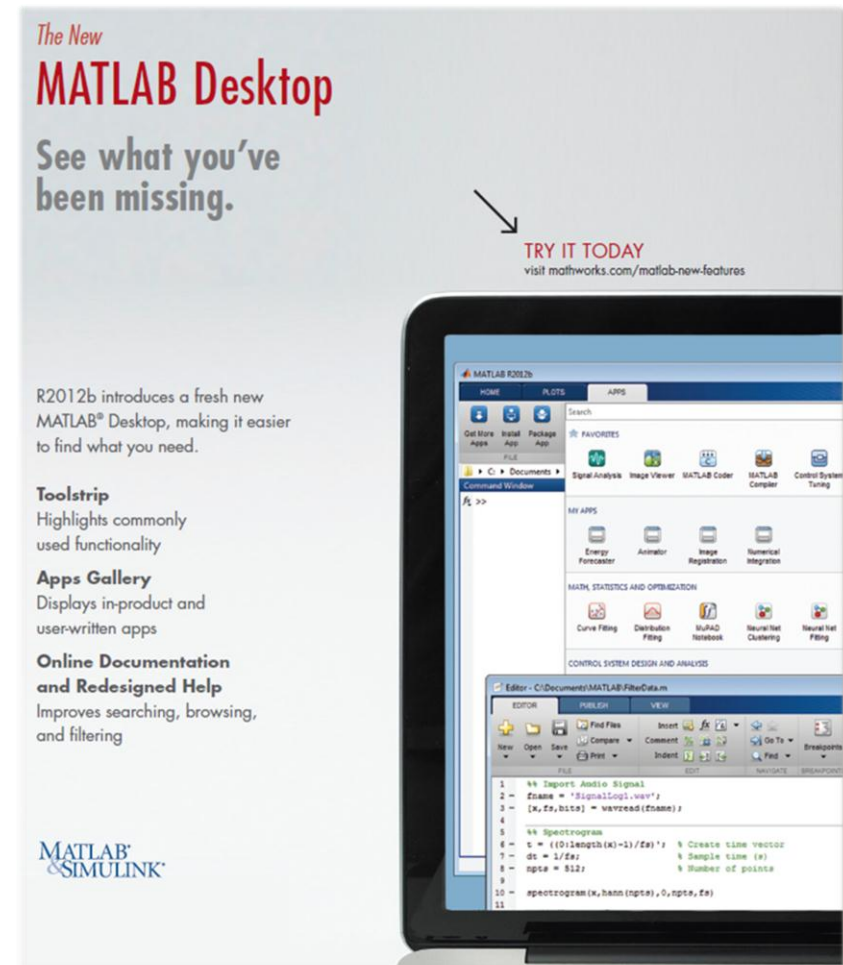
Action Menus

- Contain docking commands and relevant actions for the window
- Undock windows by using the action menu or by dragging the window out



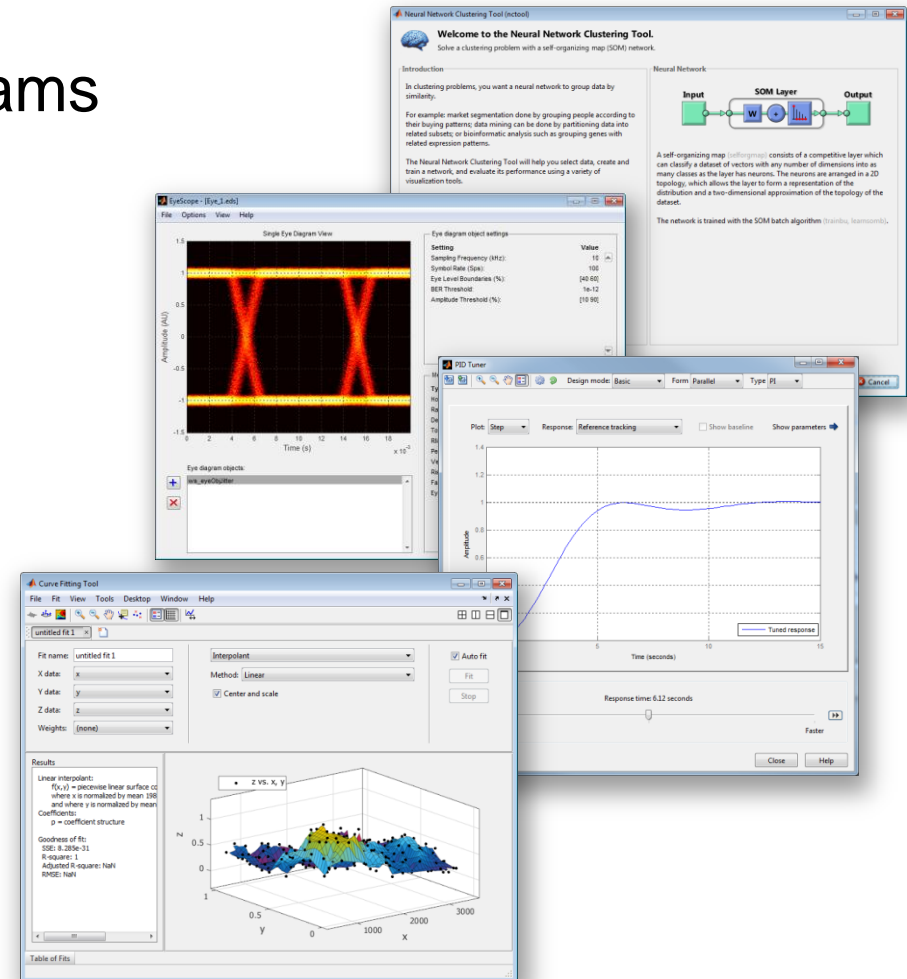
What's New in MATLAB?

- MATLAB Toolstrip
- MATLAB apps
- Import Tool
- Command line suggestions
- Help System



What are MATLAB Apps?

- Interactive MATLAB programs that include a GUI
- Apps are included in many MATLAB products
- There are also many user-written apps



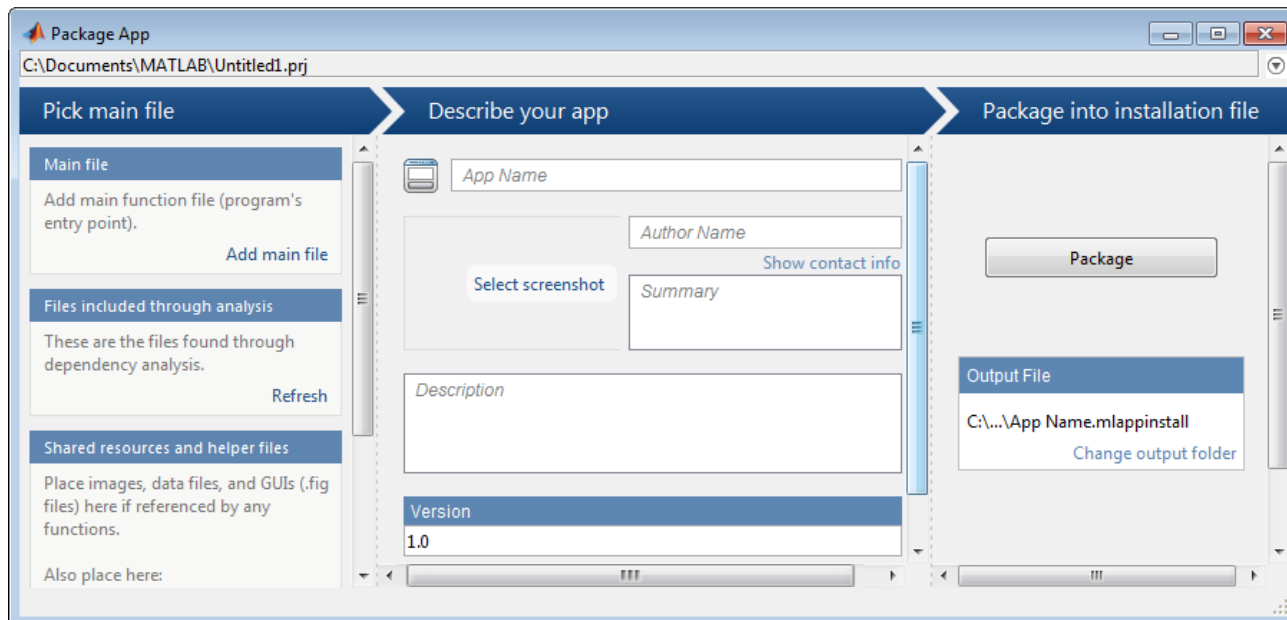
MATLAB Apps Gallery

- Tab within the MATLAB Toolstrip
- Prominently displays both user-written apps and apps included in MATLAB products
- Makes it easy to find and launch MATLAB apps

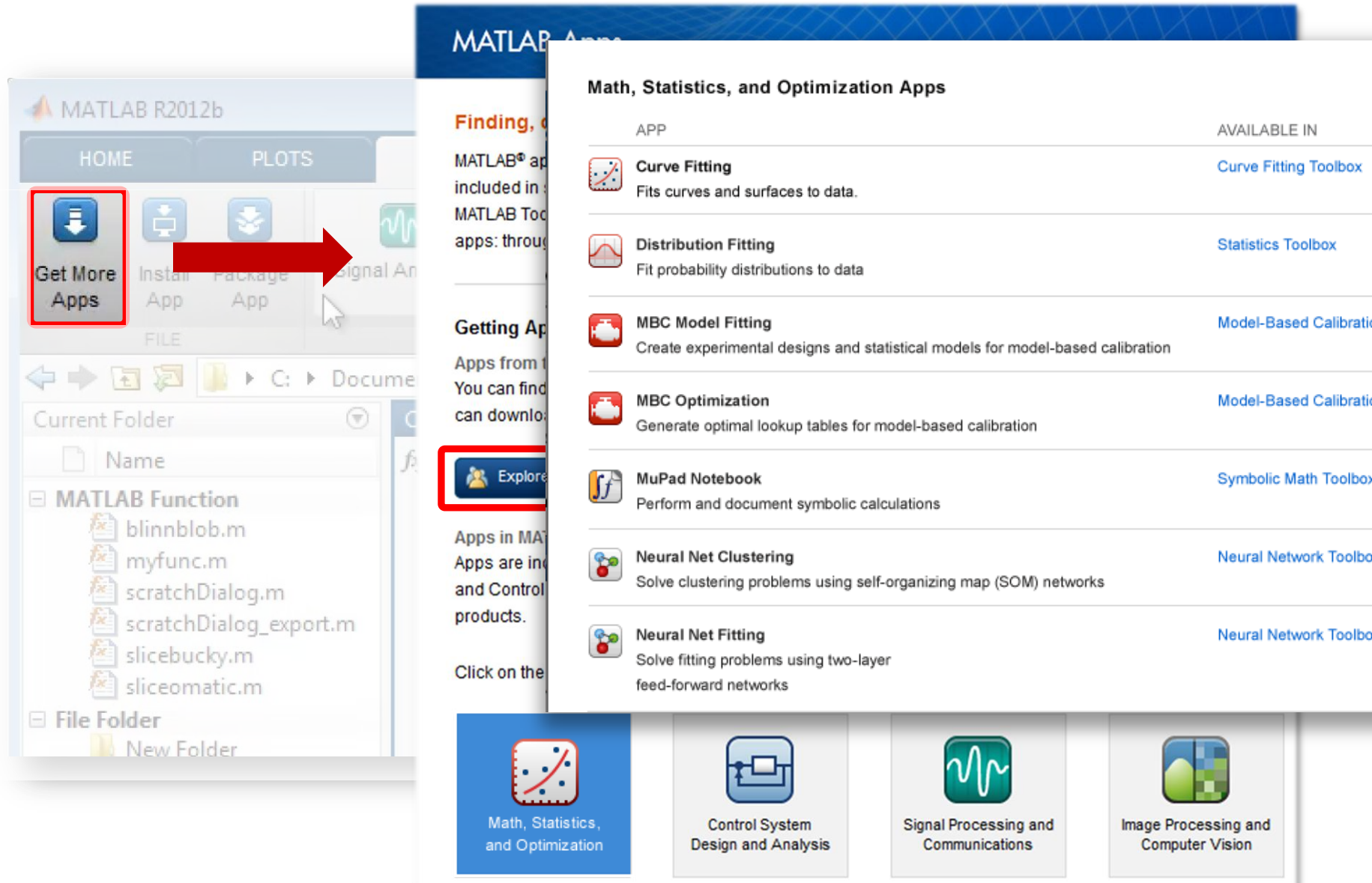


Packaging and Sharing MATLAB Apps

- Automatically includes all necessary files
- Documents required products
- Creates single installation file for easy distribution and installation into the MATLAB apps gallery










Getting More Apps



The image shows the MATLAB R2012b interface. On the left, the 'HOME' tab is active, and the 'Get More Apps' button is highlighted with a red box. A red arrow points from this button to the 'Math, Statistics, and Optimization Apps' panel on the right. The panel lists several apps with their descriptions and the toolboxes they are available in.

Math, Statistics, and Optimization Apps

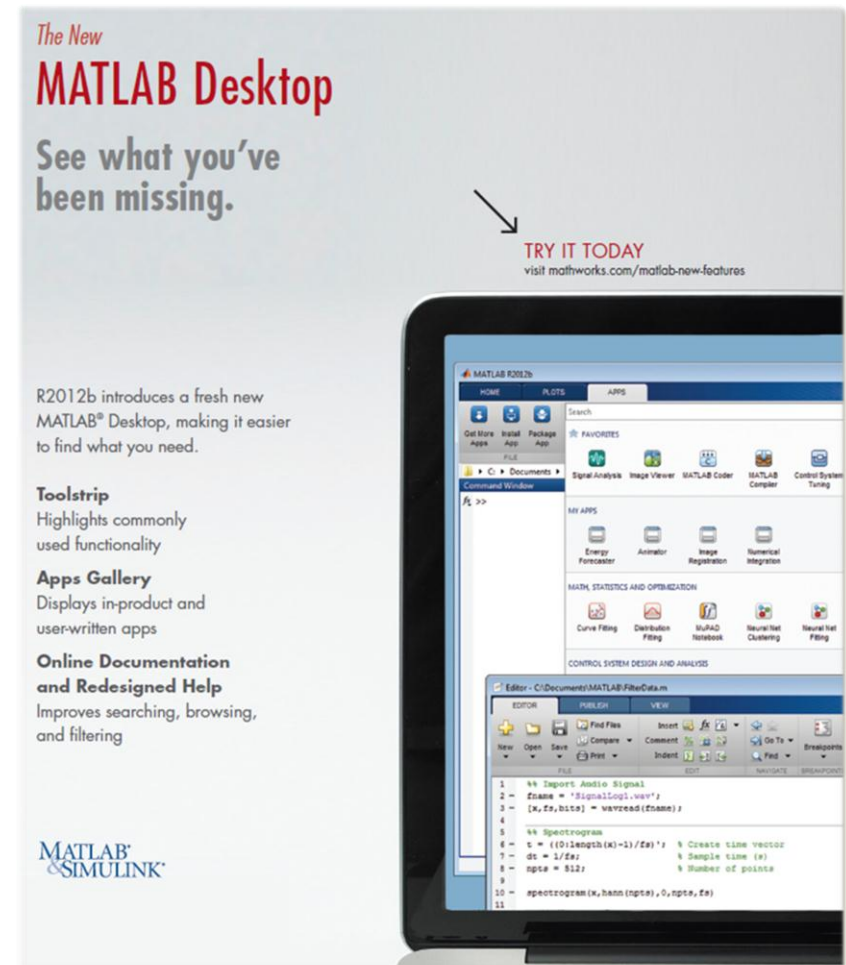
APP	AVAILABLE IN
 Curve Fitting Fits curves and surfaces to data.	Curve Fitting Toolbox
 Distribution Fitting Fit probability distributions to data	Statistics Toolbox
 MBC Model Fitting Create experimental designs and statistical models for model-based calibration	Model-Based Calibration
 MBC Optimization Generate optimal lookup tables for model-based calibration	Model-Based Calibration
 MuPad Notebook Perform and document symbolic calculations	Symbolic Math Toolbox
 Neural Net Clustering Solve clustering problems using self-organizing map (SOM) networks	Neural Network Toolbox
 Neural Net Fitting Solve fitting problems using two-layer feed-forward networks	Neural Network Toolbox

At the bottom of the interface, there are four large buttons representing different app categories:

- Math, Statistics, and Optimization** (with a red box around the icon)
- Control System Design and Analysis**
- Signal Processing and Communications**
- Image Processing and Computer Vision**

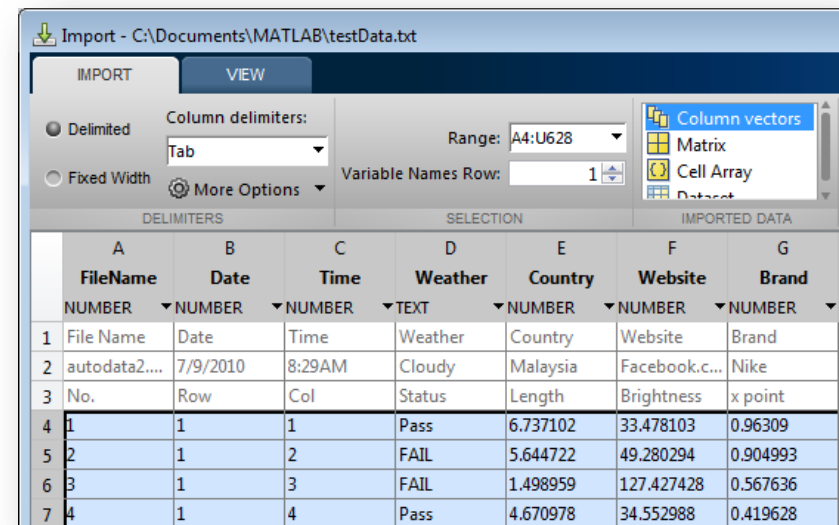
What's New in MATLAB?

- MATLAB Toolstrip
- MATLAB apps
- Import Tool
- Command line suggestions
- Help System



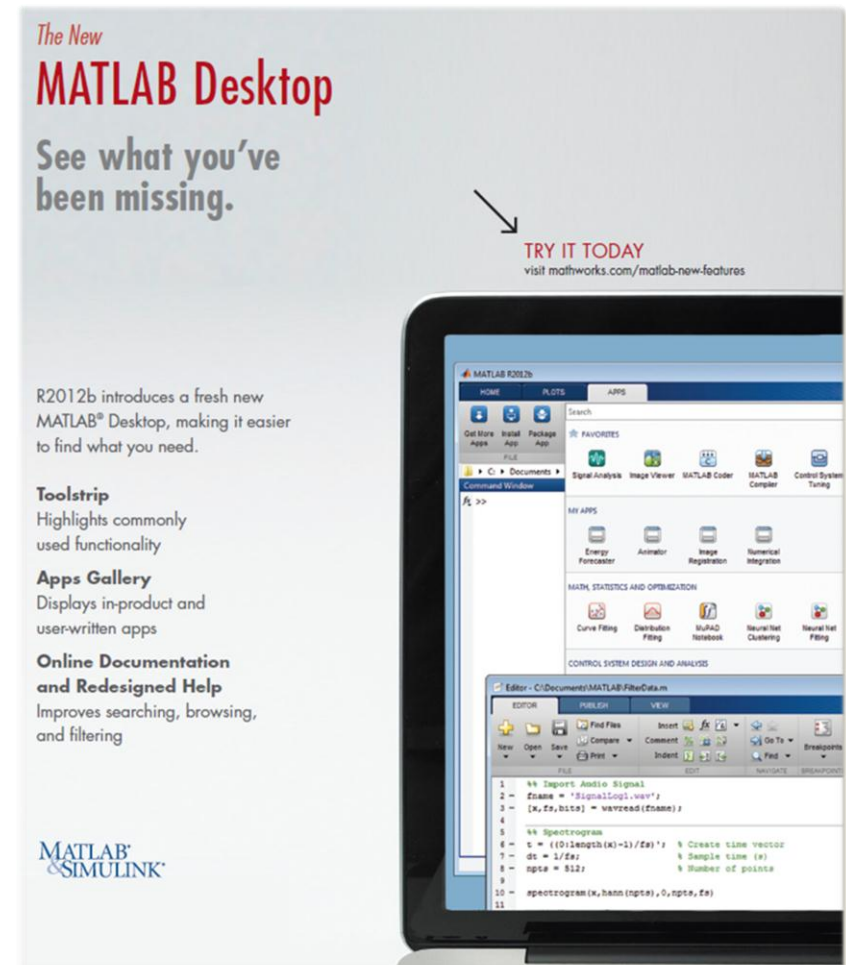
Import Tool

- Interactive import of delimited and fixed-width text files
- Improved handling of:
 - Mixed numeric and text data
 - Dates
- Define rules for handling nonnumeric values
- Automatically generate MATLAB code (scripts and functions) to automate the process



What's New in MATLAB?

- MATLAB Toolstrip
- MATLAB apps
- Import Tool
- Command line suggestions
- Help System



Command Line Suggestions

- Suggested corrections for mistyped functions and variables in the Command Window
- Press Enter to execute the suggested command, or Esc to delete it

```
>> datstr(Date(1))  
Undefined function 'datstr' for input  
arguments of type 'double'.
```

```
Did you mean:
```

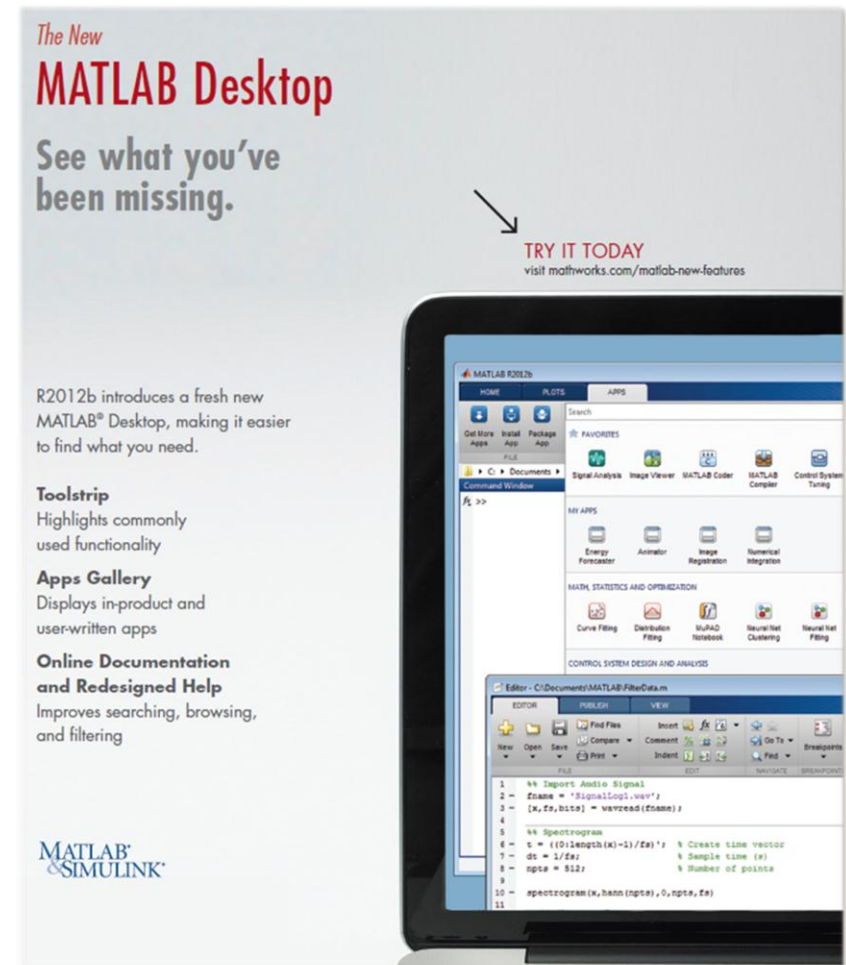
```
>> datestr(Date(1))
```

```
ans =
```

```
01-Jan-2005 01:00:00
```

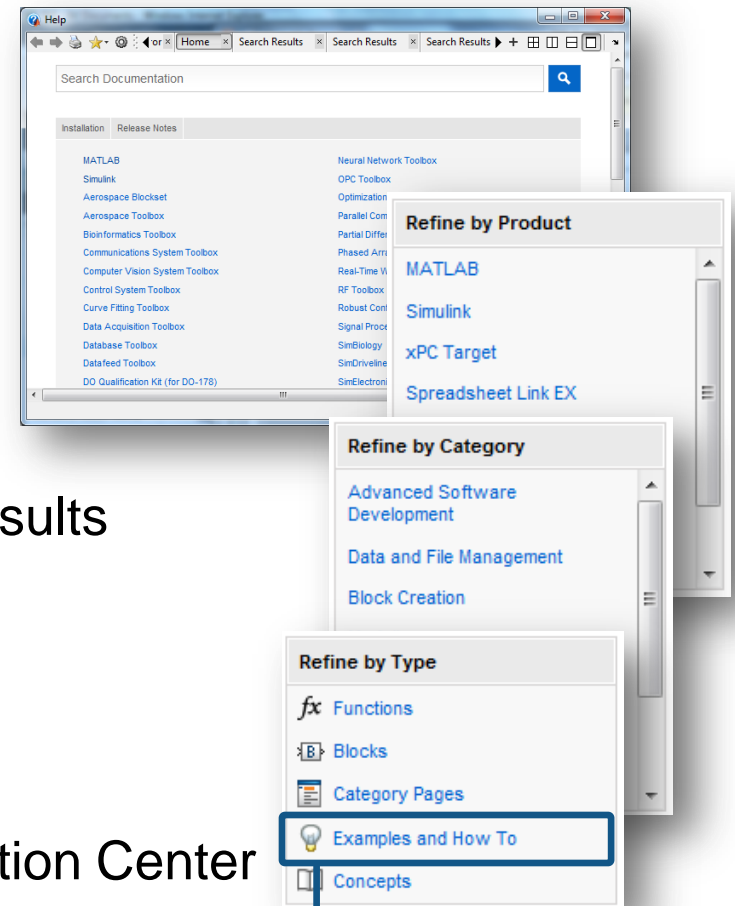
What's New in MATLAB?

- MATLAB Toolstrip
- MATLAB apps
- Import Tool
- Command line suggestions
- Help System



Documentation Center and Redesigned Help

- Content organized by topic rather than content type
- Browser-like interface, with improved search
 - Facets allow users to filter search results
 - Multiple tabs
- Documentation installed locally
 - Option to use the online Documentation Center



**Demos are now
“Examples”**

Release 2012b Highlights

MATLAB

Introducing the new MATLAB Desktop:
making it easier to find what you need.

The New
MATLAB Desktop

See what you've
been missing.

TRY IT TODAY
visit mathworks.com/matlab-new-features

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



MATLAB® SIMULINK®

Simulink

Introducing the new Simulink Editor:
making it easier to build, manage,
navigate and simulate your models.

**DISCOVER
THE NEW
LOOK AND FEEL
of
Simulink**

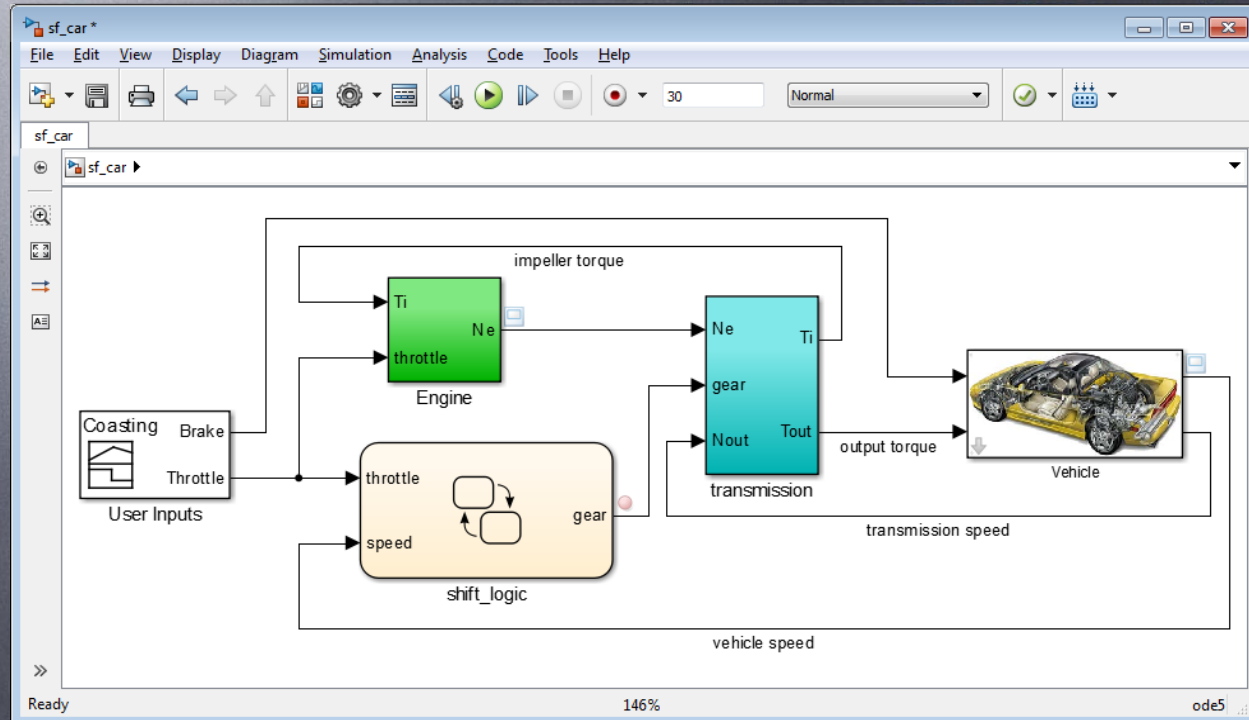
TRY IT TODAY
visit mathworks.com

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



MATLAB® SIMULINK®



Introducing the New Simulink Editor

Simulink R2012b is the most significant upgrade to Simulink Ever!

Model-Based Design Industry Trends	Simulink R2012b Capabilities
Huge models to capture complex behavior across systems and in components	Tabbed windows and Explorer bar to navigate model hierarchy and access key sections of the design.
Models to communicate designs and specifications, not just to create them	Smart signal routing and new Stateflow Editor to help create clean-looking models.
Simulation to understand, design, verify and analyze systems	Ability to add signal breakpoints and step back and forth through a simulation.

What's New in Simulink?

- Simulink Editor
- Smart Signal Routing
- Simulation & Analysis Tools
- Rapid Prototyping

**DISCOVER
THE NEW
LOOK AND FEEL
of
Simulink**

TRY IT TODAY
visit mathworks.com

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

MATLAB®
SIMULINK®

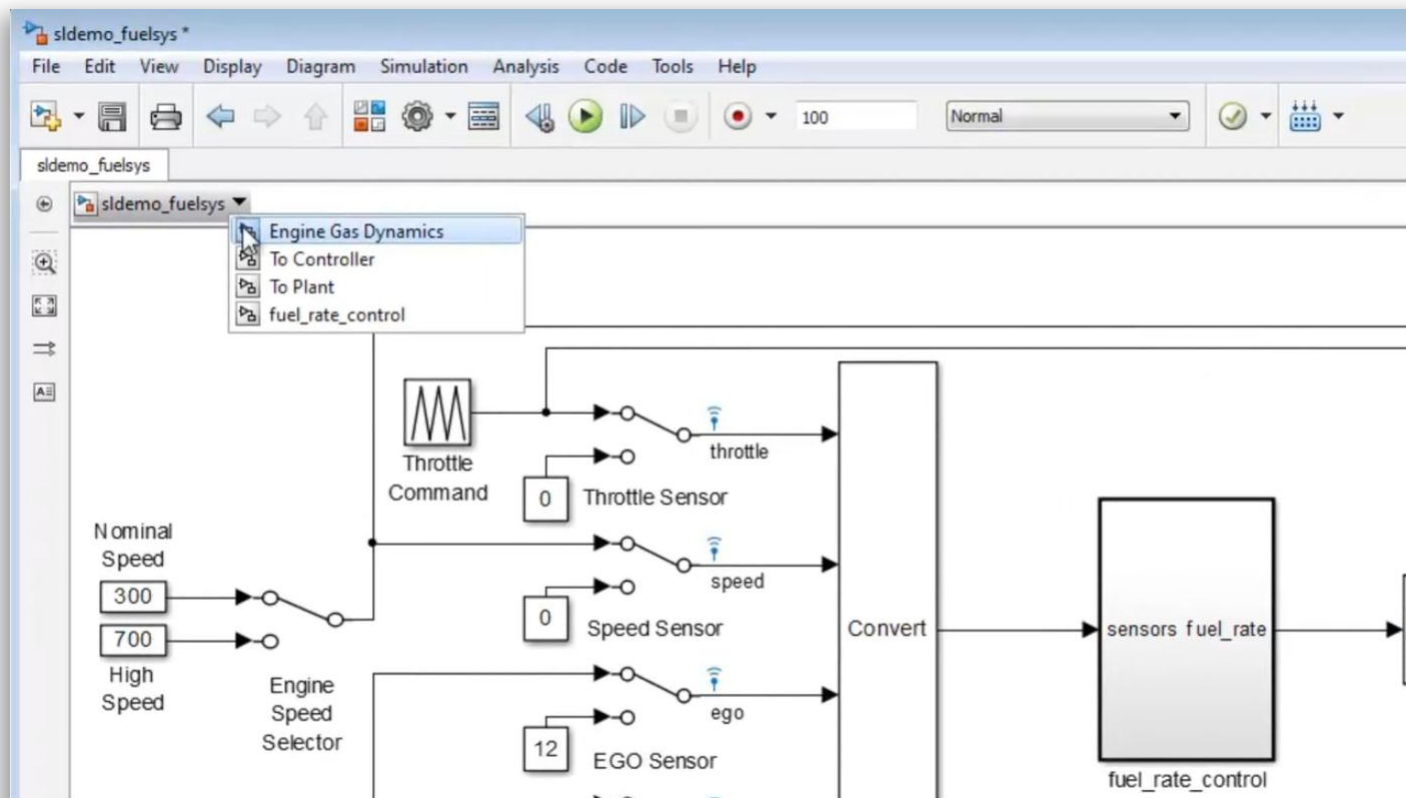


Brand New Design Environment

- Build readable models efficiently
 - NEW LOOK AND FEEL, SMART GUIDES, ACCESSIBILITY
- Understand parts of a design file easily
 - TABS, EXPLORER BAR
- Exclude parts of a design
 - COMMENT OUT
- Use rich modeling semantics
 - CONTROL LOGIC (STATEFLOW),
 - DISCRETE EVENT (SIMEVENTS),
 - PHYSICAL MODELING (SIMSCAPE)

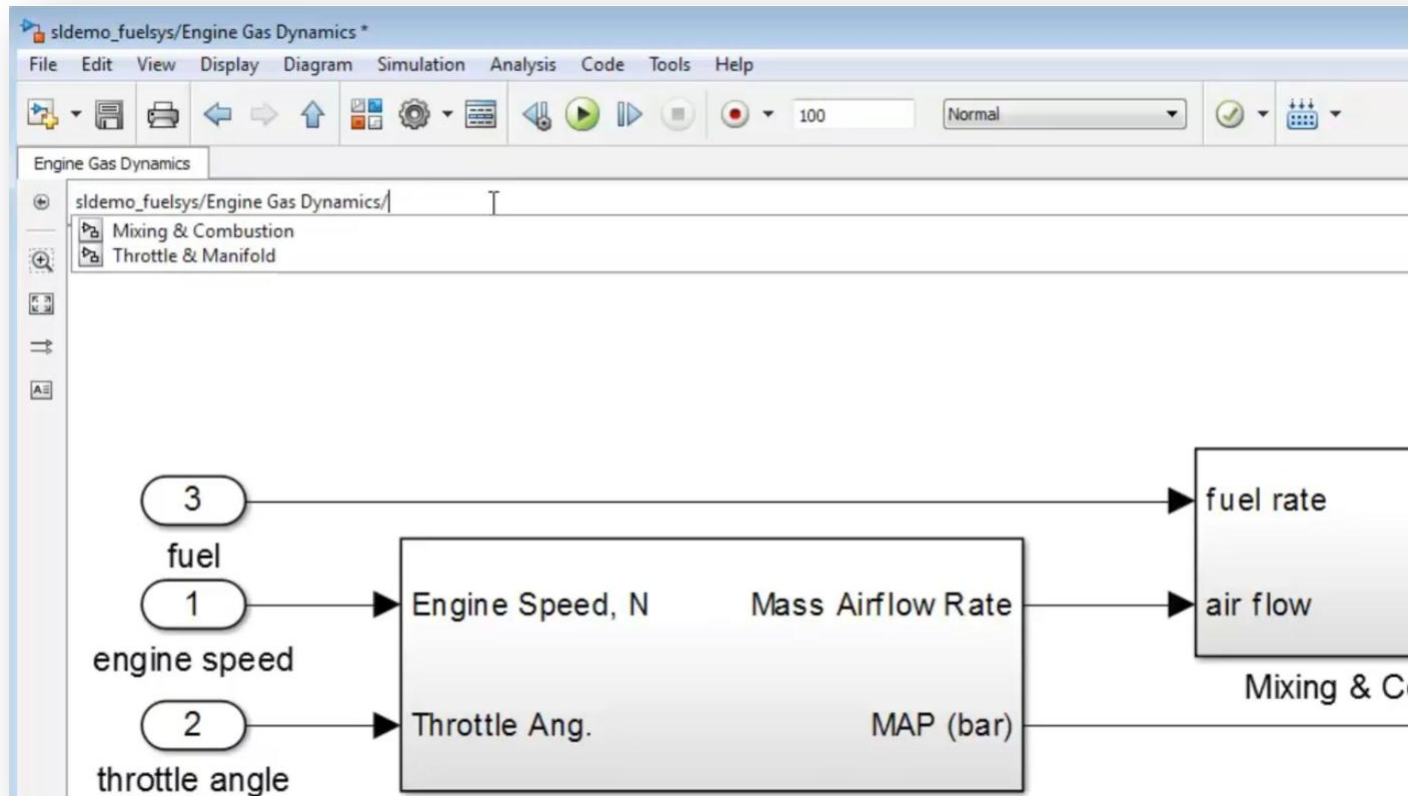
Explorer Bar

Navigate model hierarchy



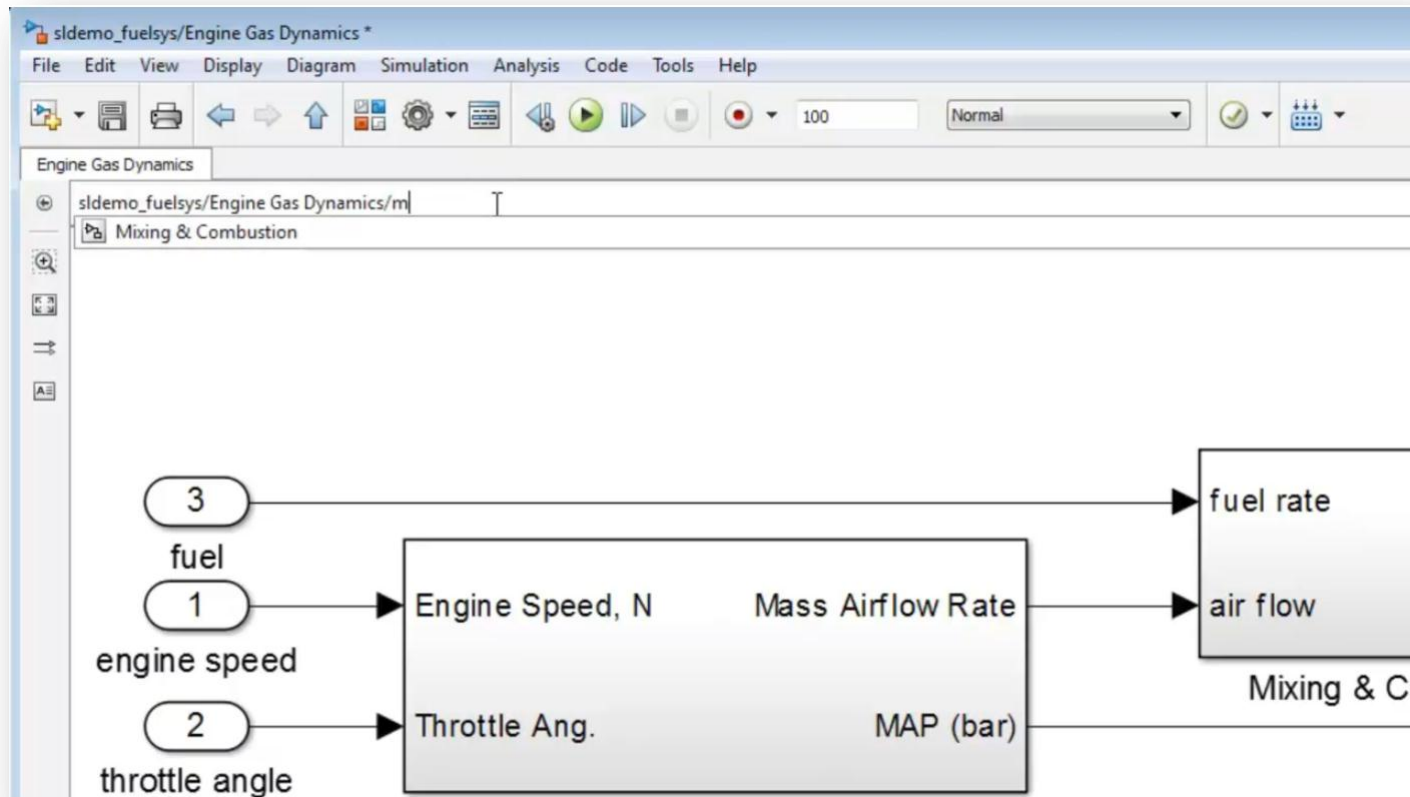
Explorer Bar

Navigate model hierarchy



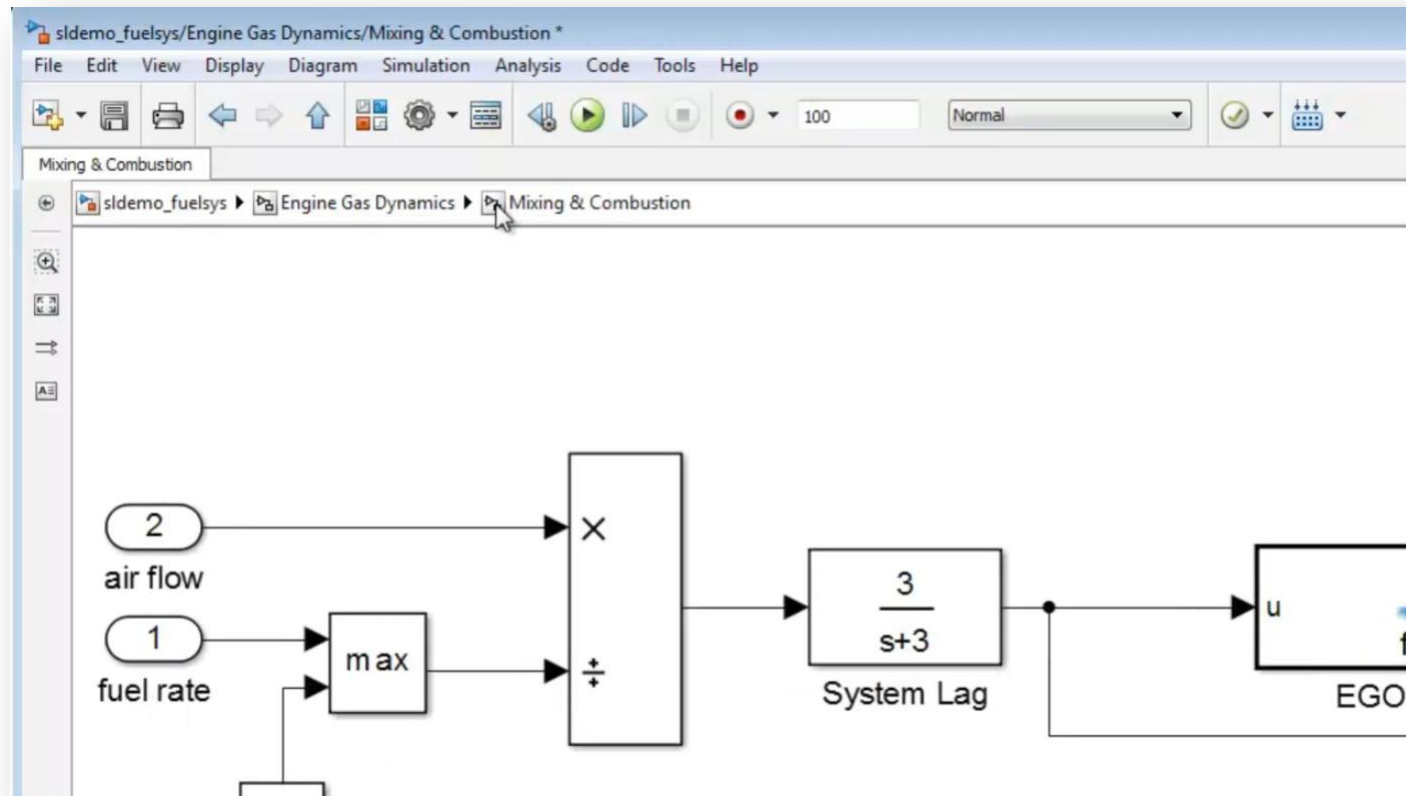
Explorer Bar

Navigate model hierarchy



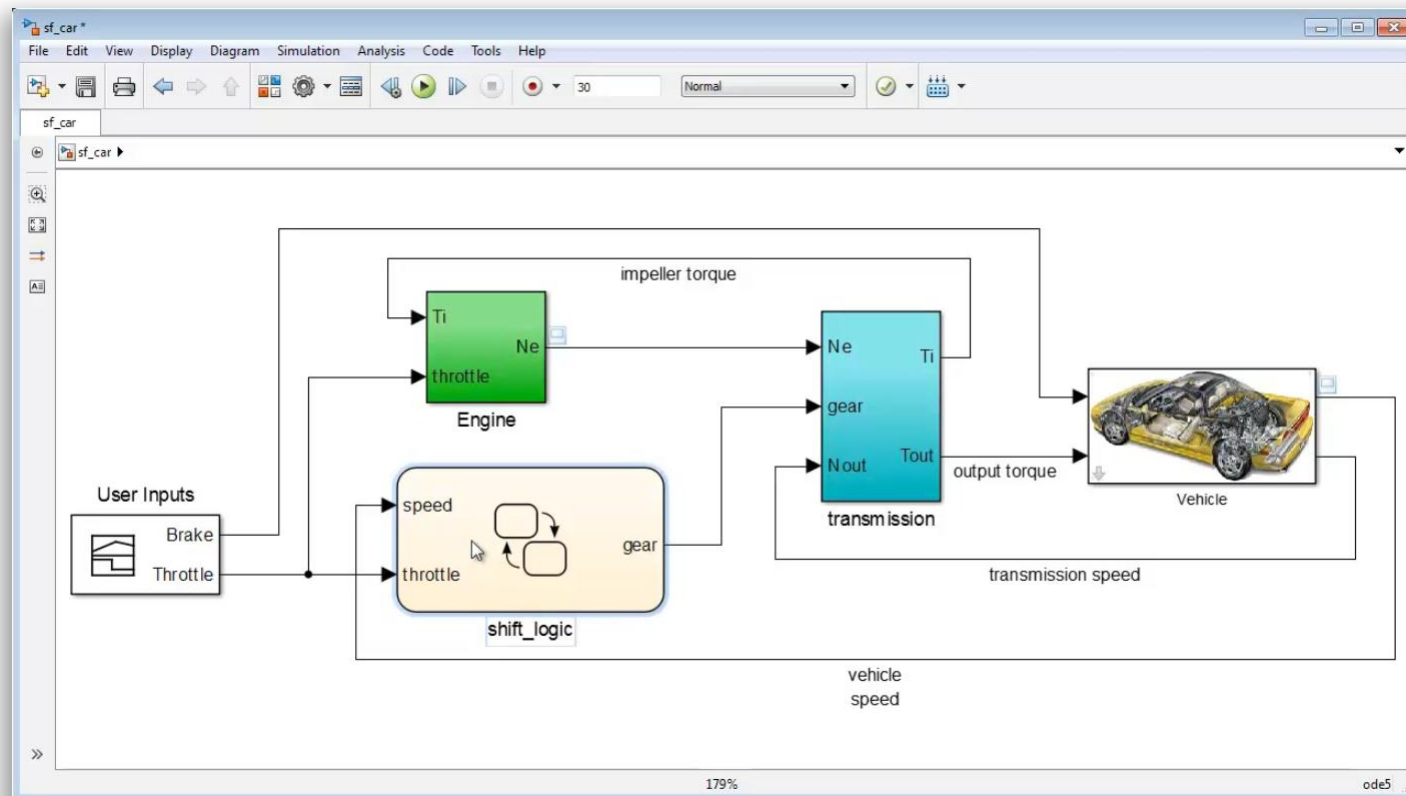
Explorer Bar

Navigate model hierarchy



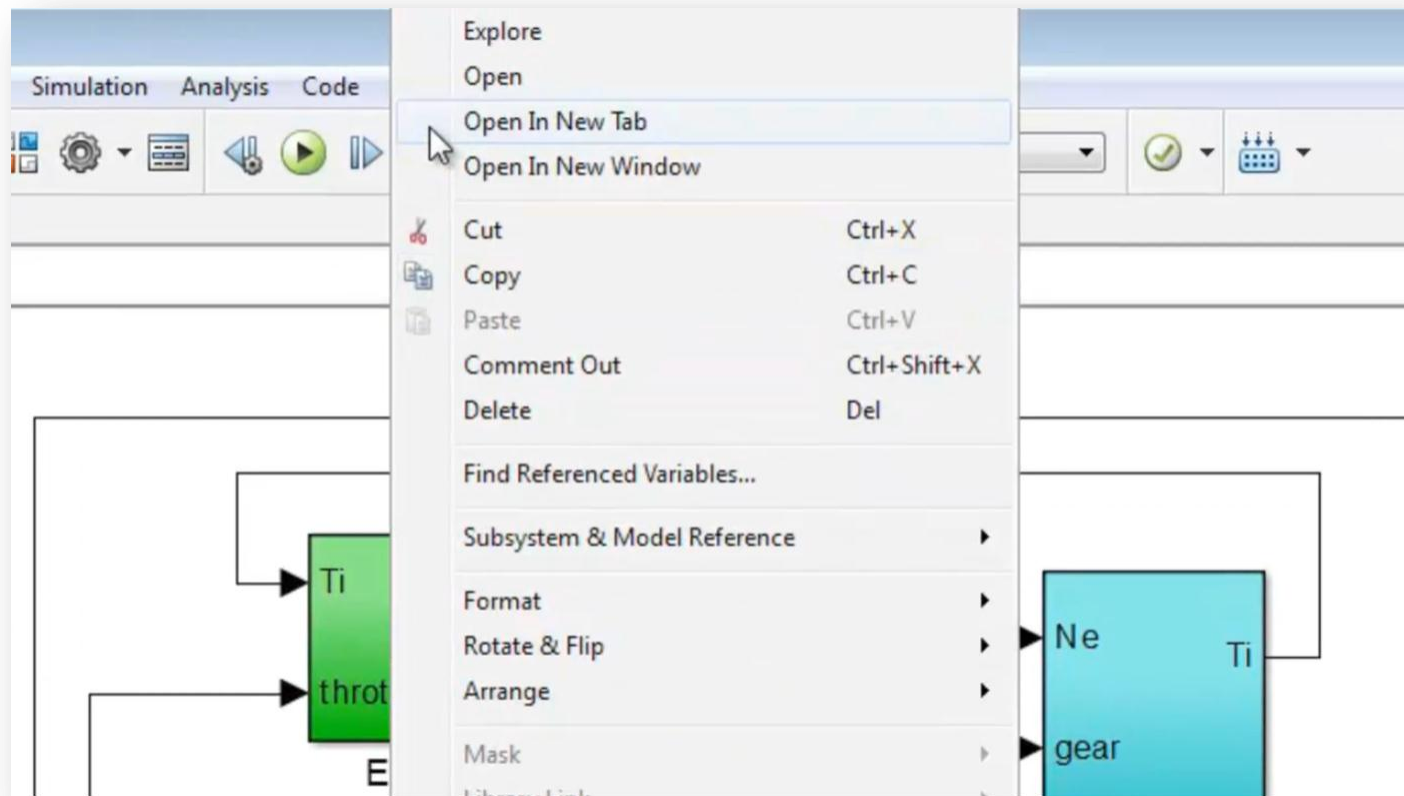
Tabbed Windows

Key sections of the model at your fingertips



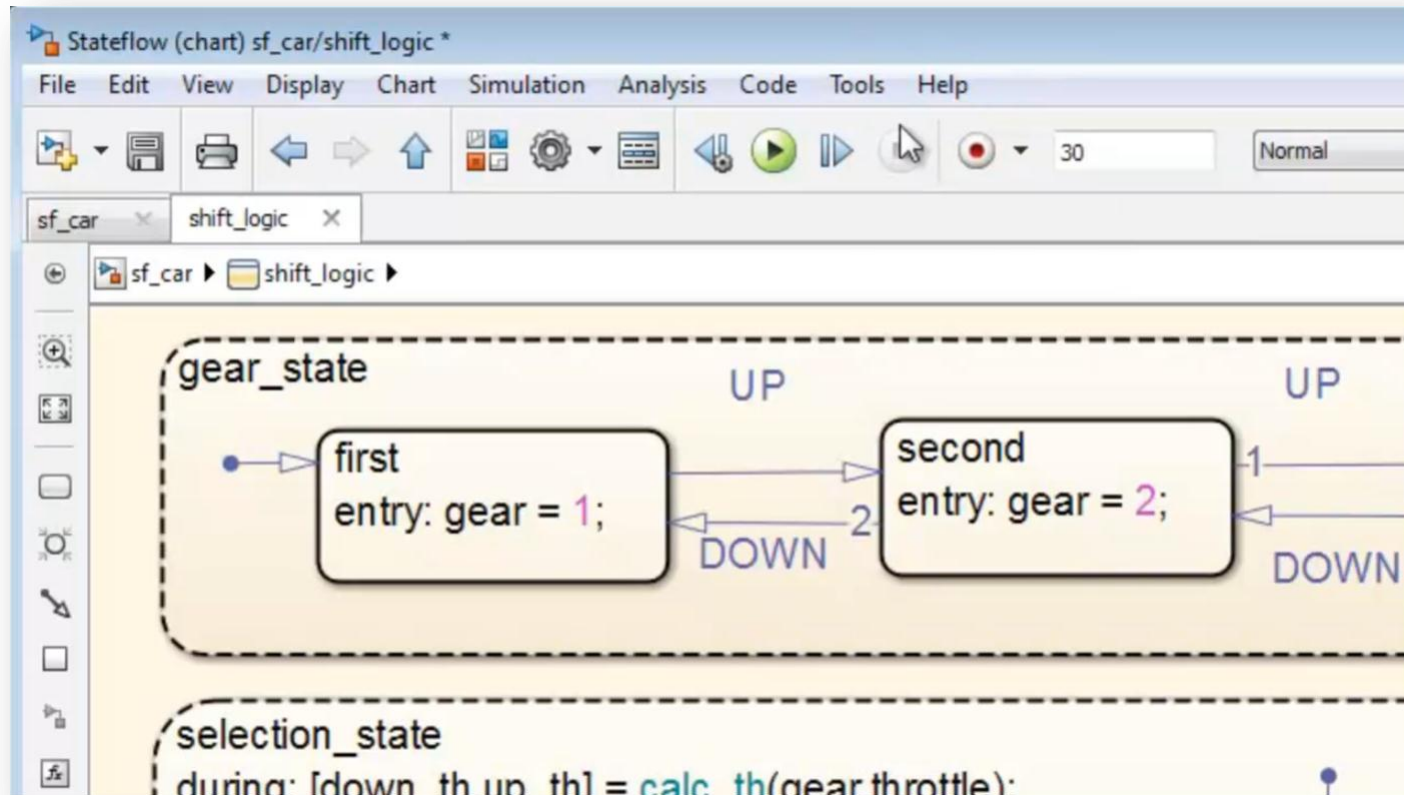
Tabbed Windows

Key sections of the model at your fingertips



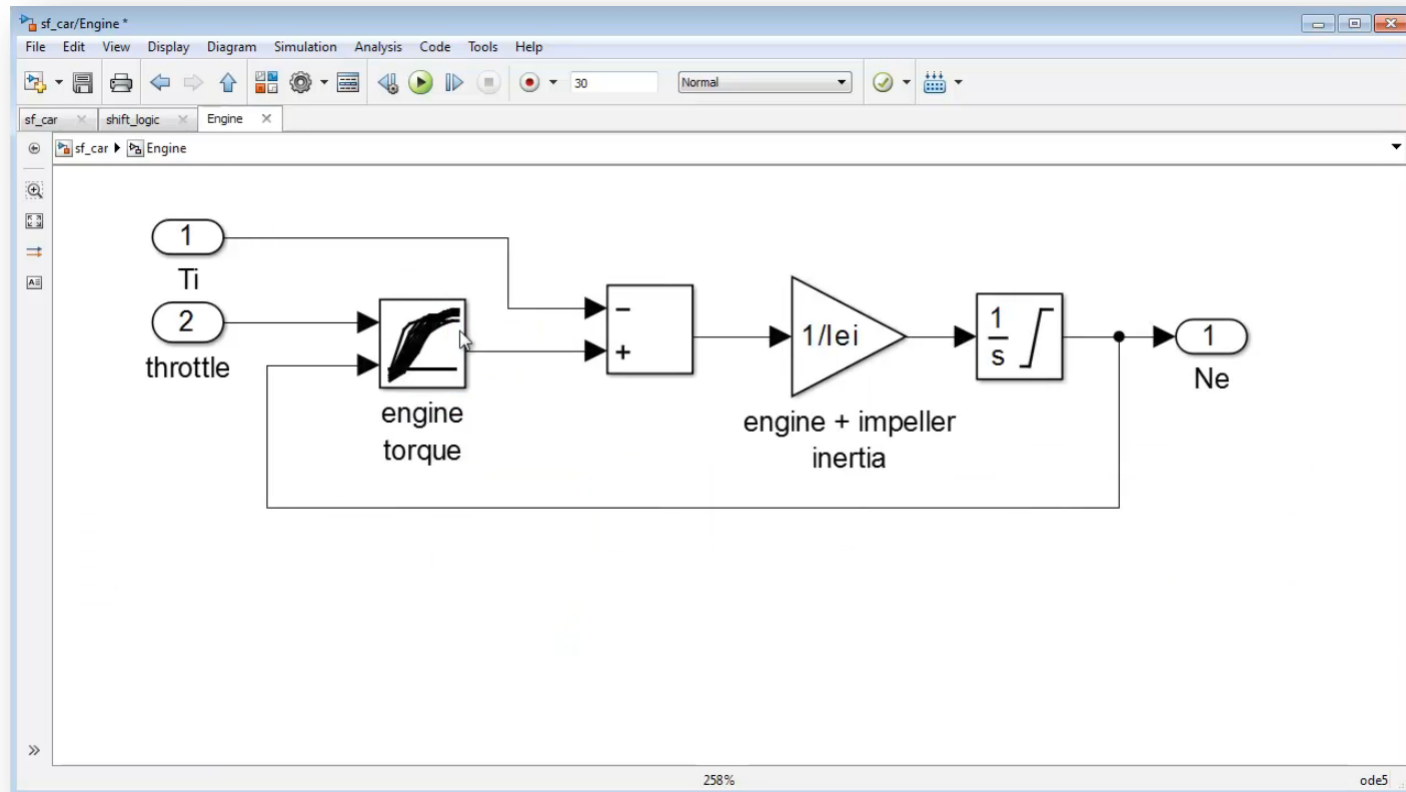
Tabbed Windows

Key sections of the model at your fingertips



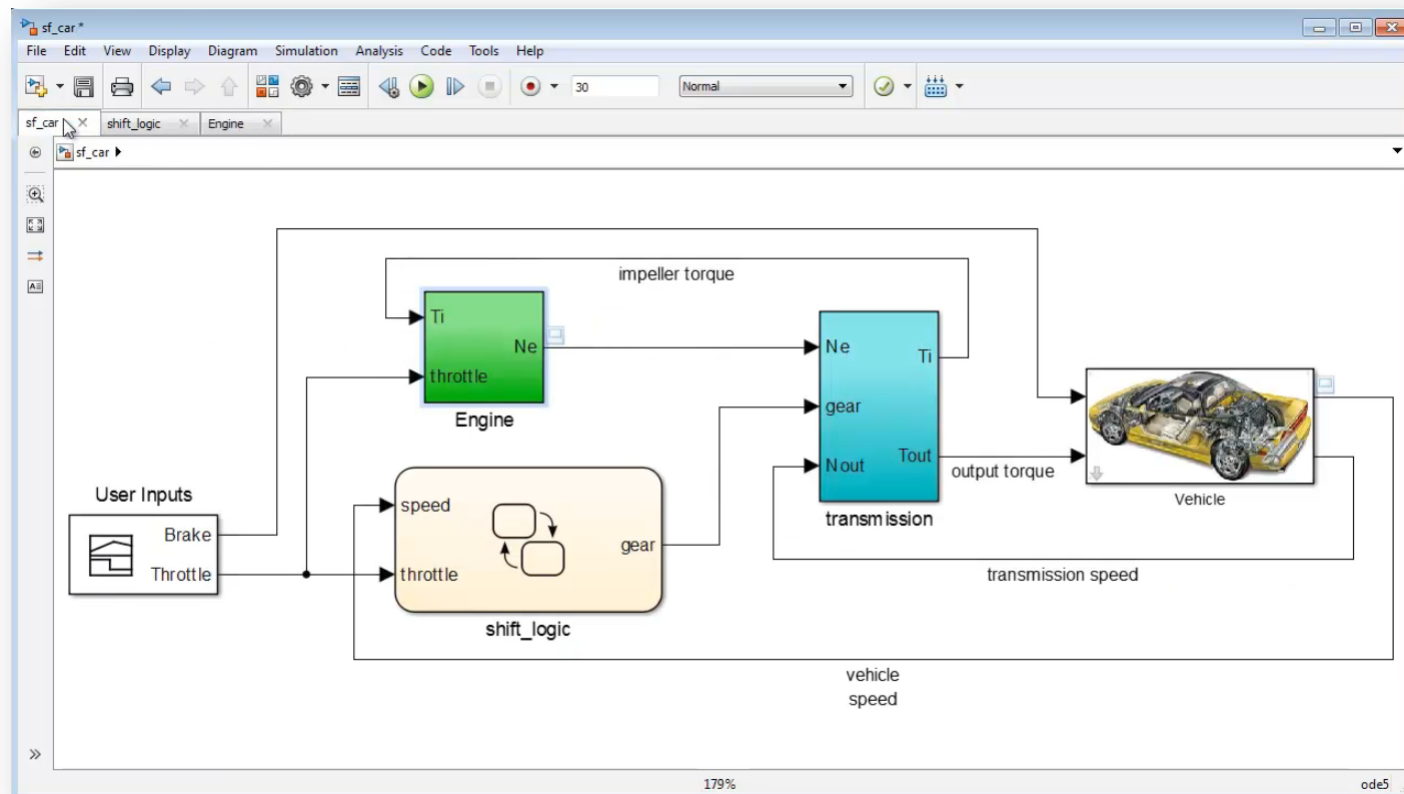
Tabbed Windows

Key sections of the model at your fingertips



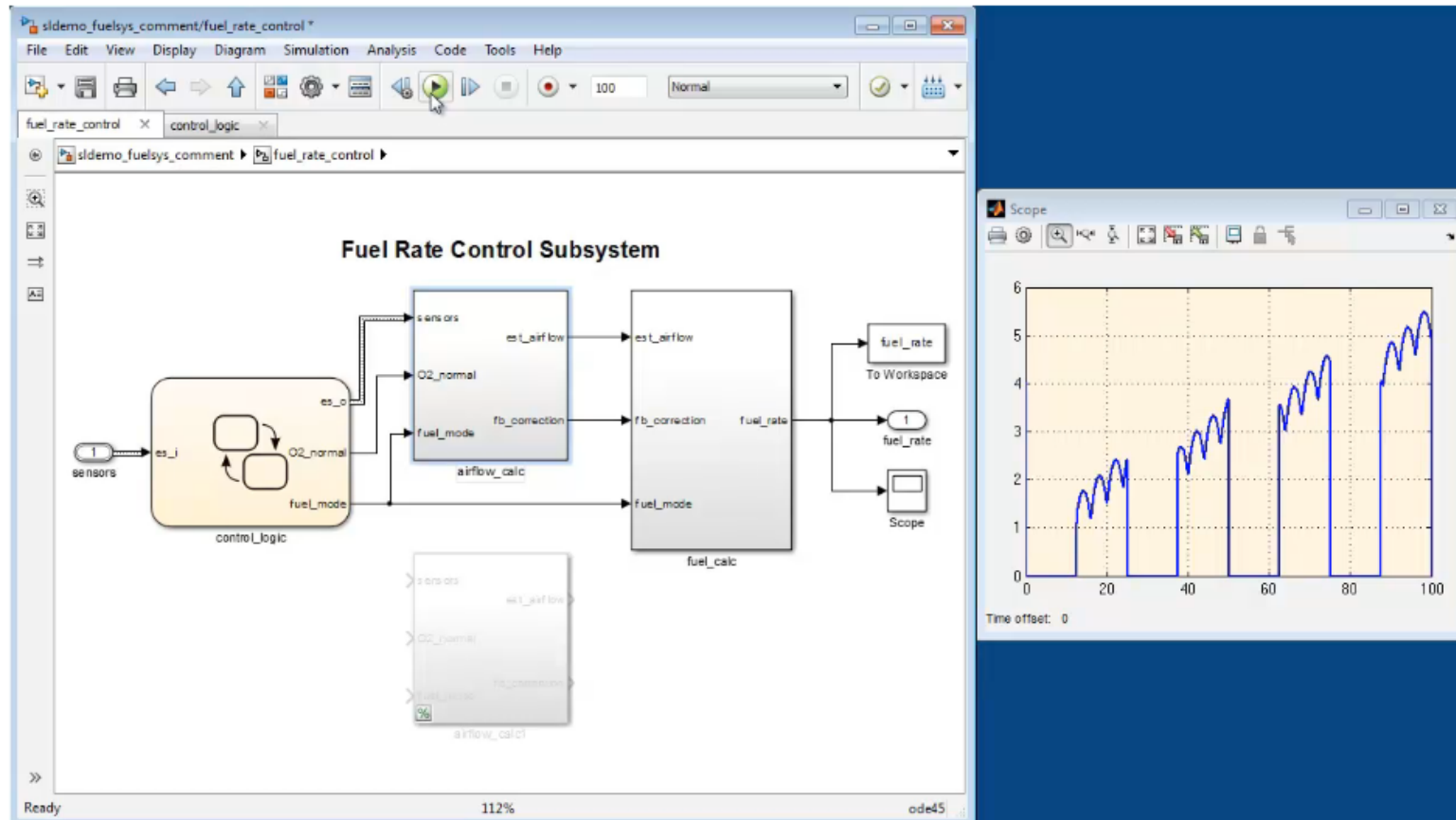
Tabbed Windows

Key sections of the model at your fingertips



Comment Out Blocks

Test variations of the model



What's New in Simulink?

- Simulink Editor
- Smart Signal Routing
- Simulation & Analysis Tools
- Rapid Prototyping

**DISCOVER
THE NEW
LOOK AND FEEL
of
Simulink**

TRY IT TODAY
visit mathworks.com

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

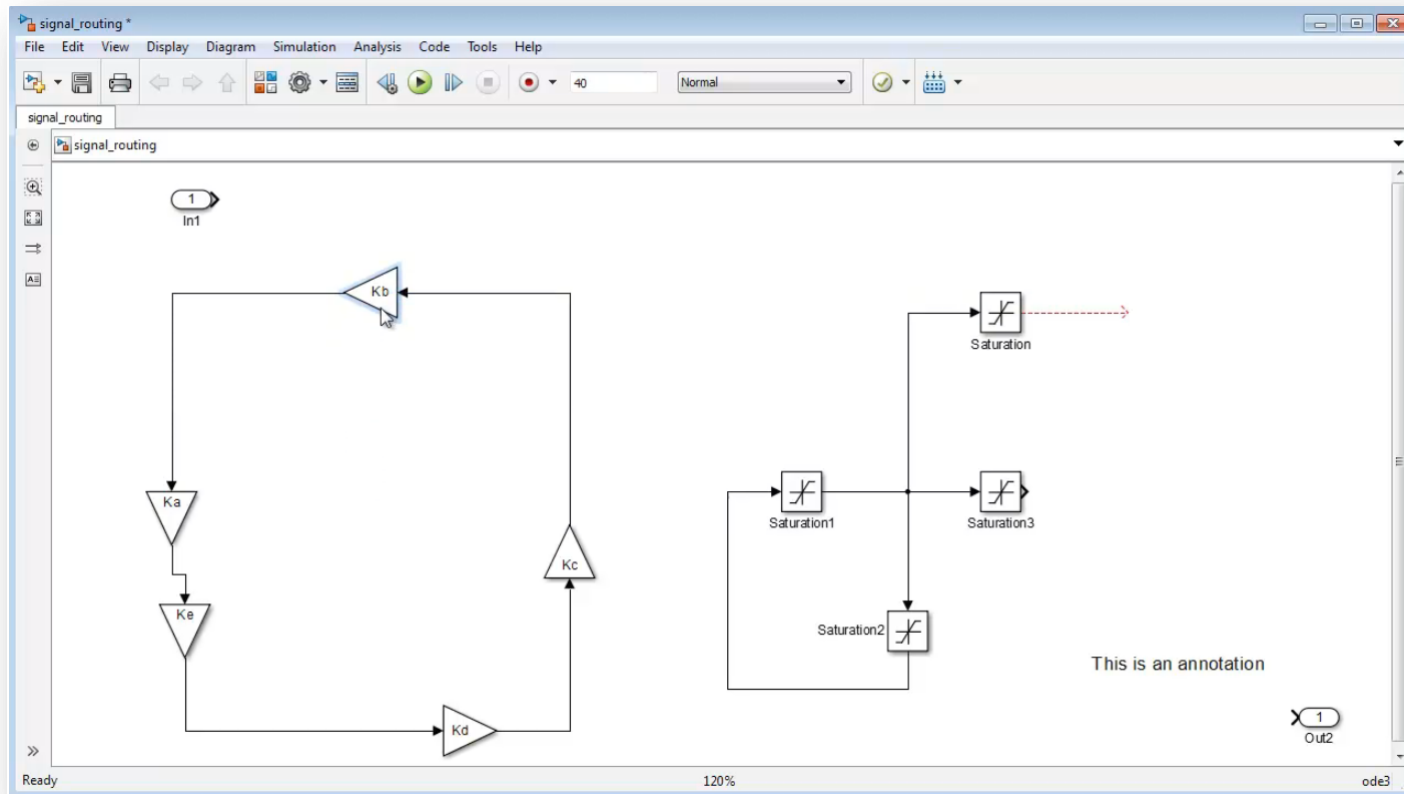
- Smart line routing
- Tabbed model windows
- Simulation rewind
- Signal breakpoints
- Explorer bar
- Subsystem and signal badges
- Project management

MATLAB®
SIMULINK®



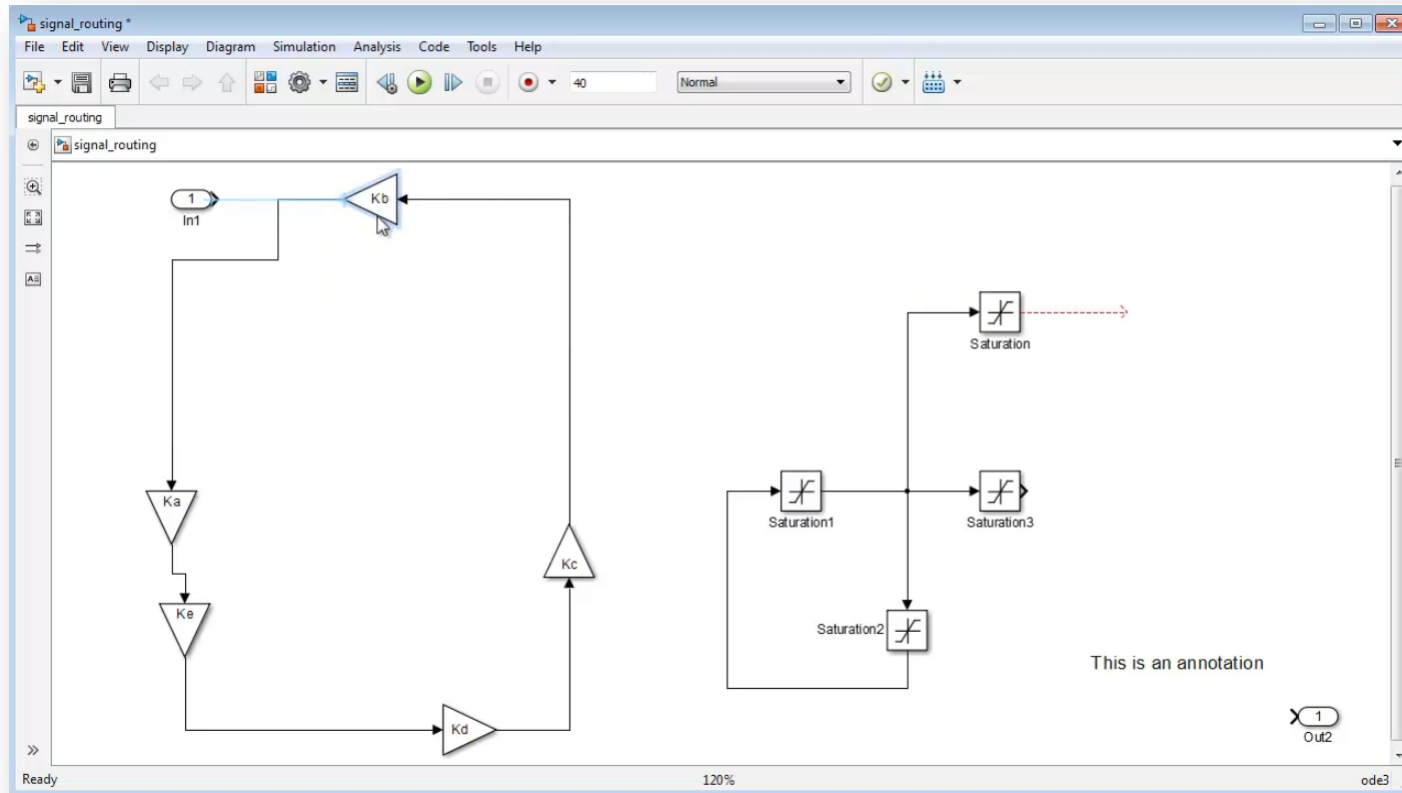
Smart Signal Routing

Determine the optimal signal path



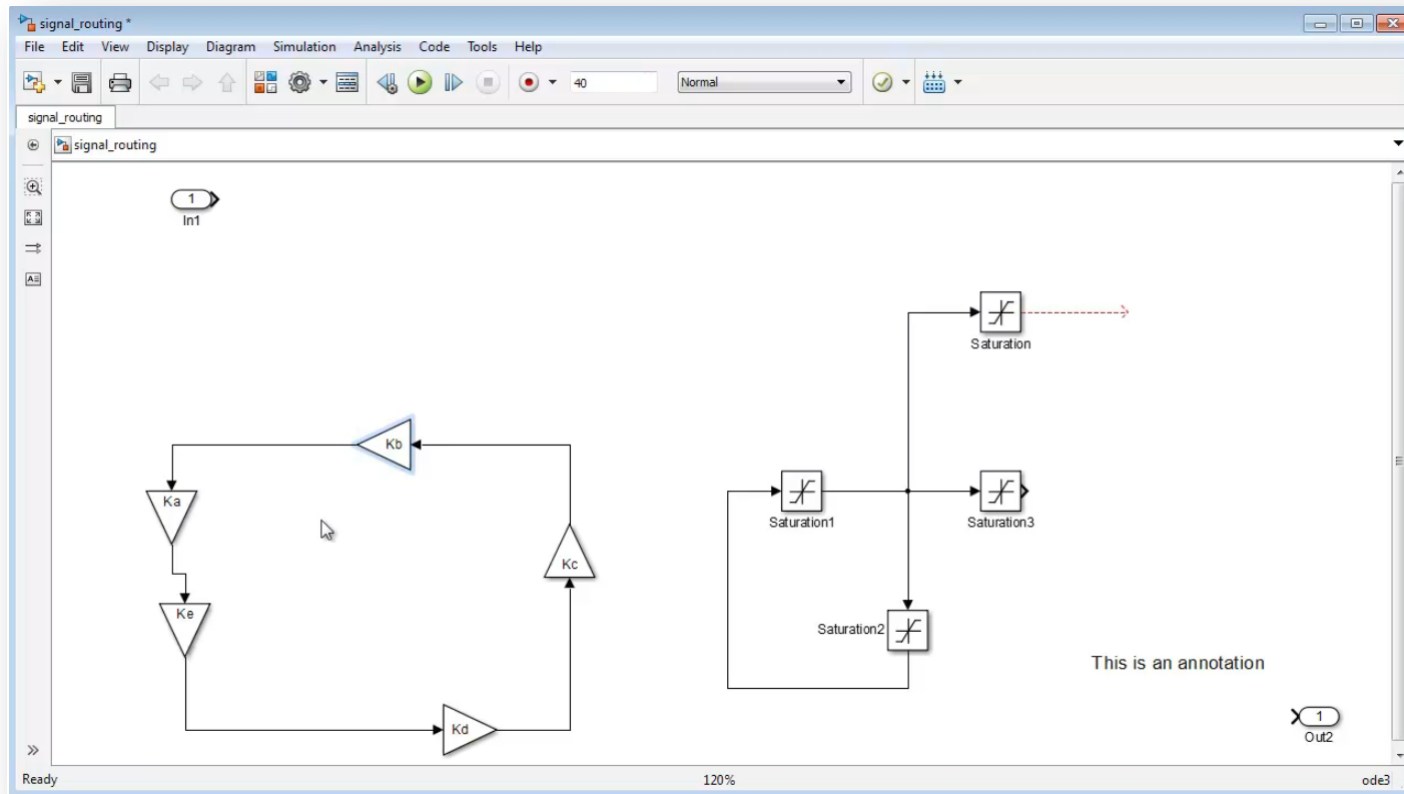
Smart Signal Routing

Determine the optimal signal path



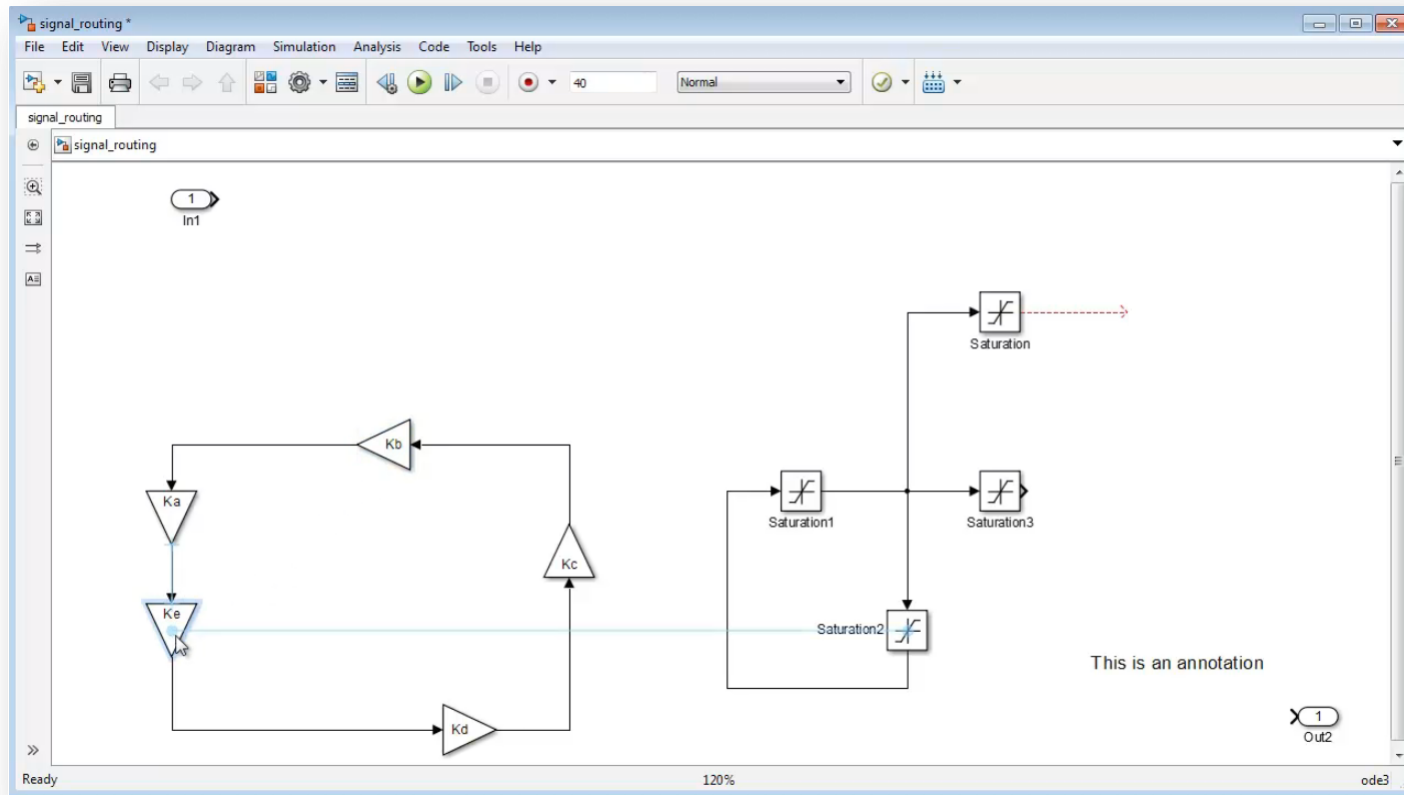
Smart Signal Routing

Determine the optimal signal path



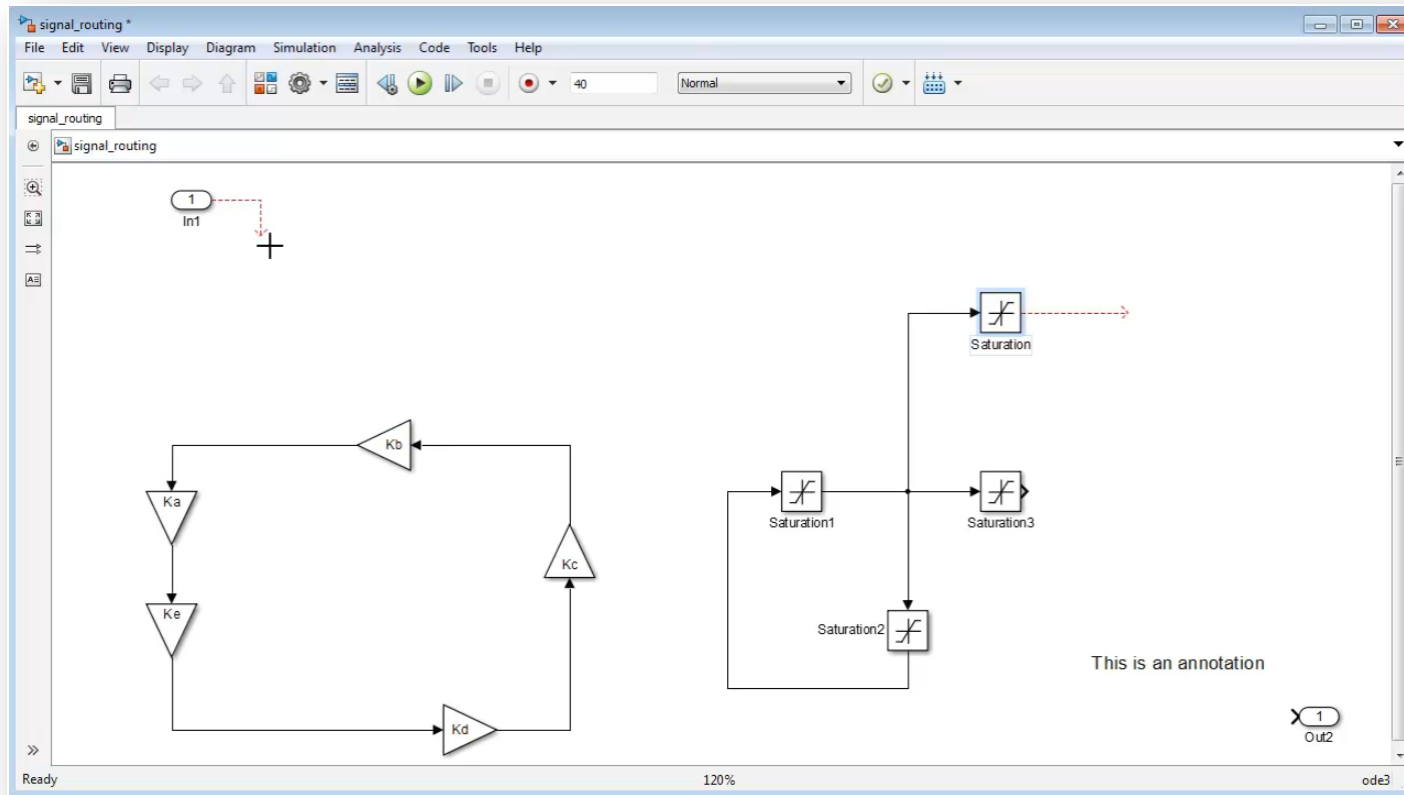
Smart Signal Routing

Determine the optimal signal path



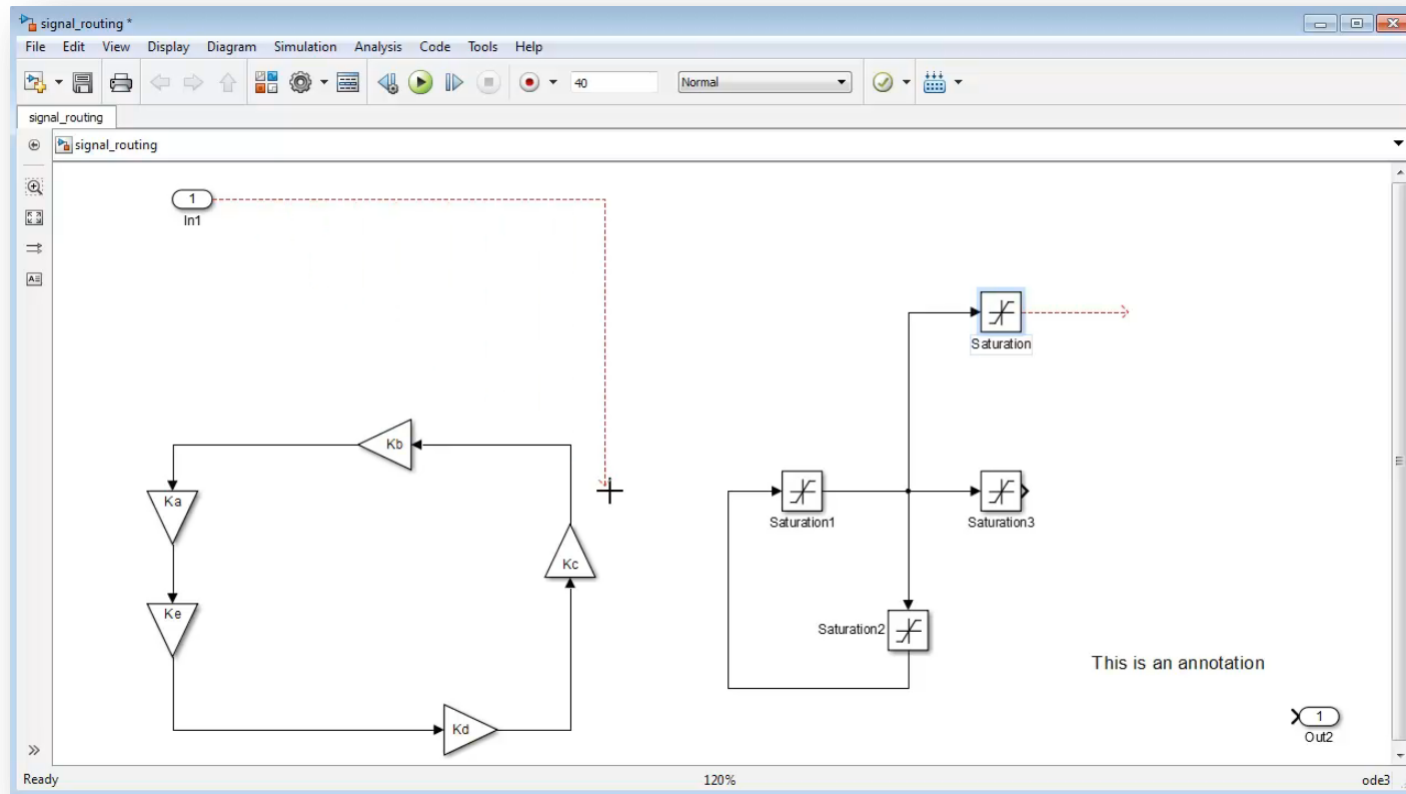
Smart Signal Routing

Determine the optimal signal path



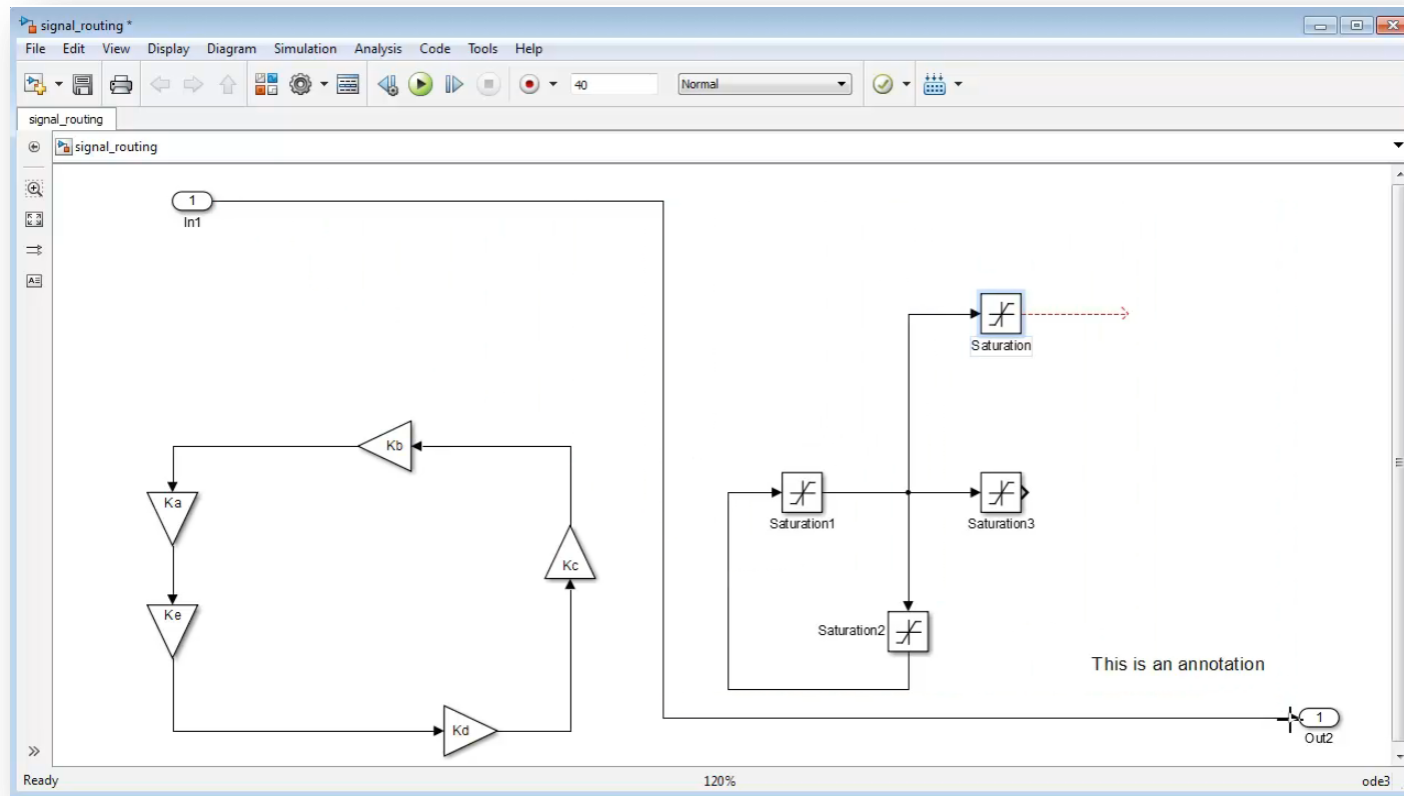
Smart Signal Routing

Determine the optimal signal path



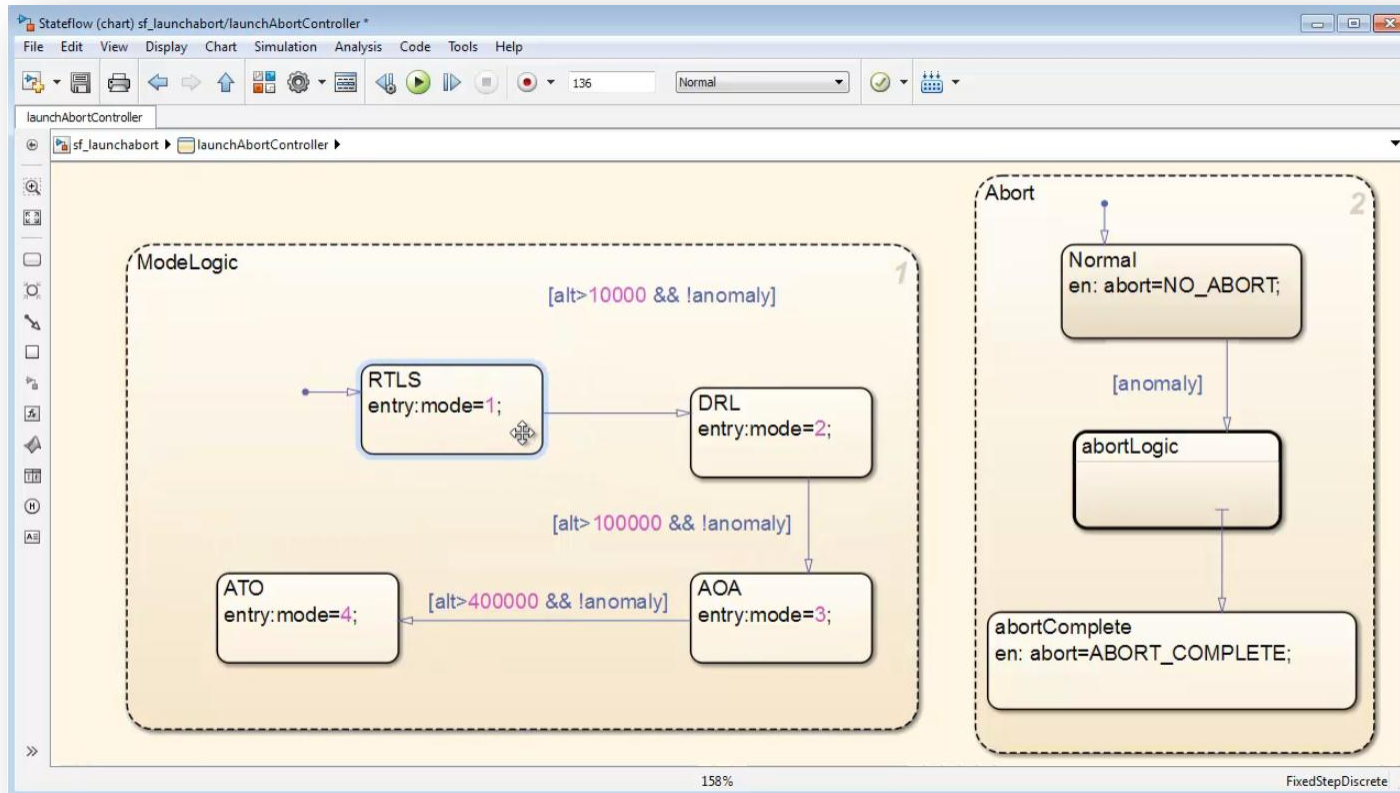
Smart Signal Routing

Determine the optimal signal path



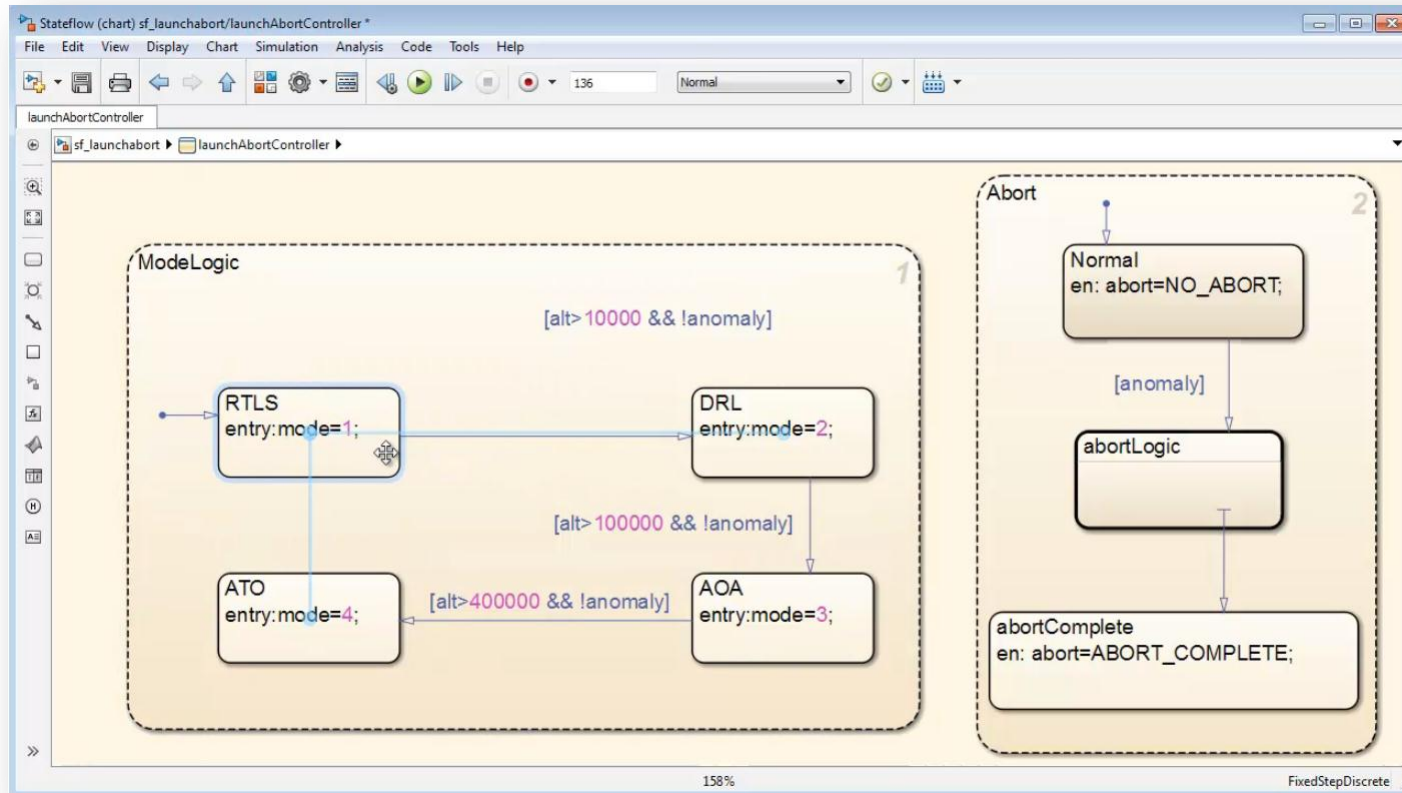
New Stateflow Editor

Organize the logic



New Stateflow Editor

Organize the logic

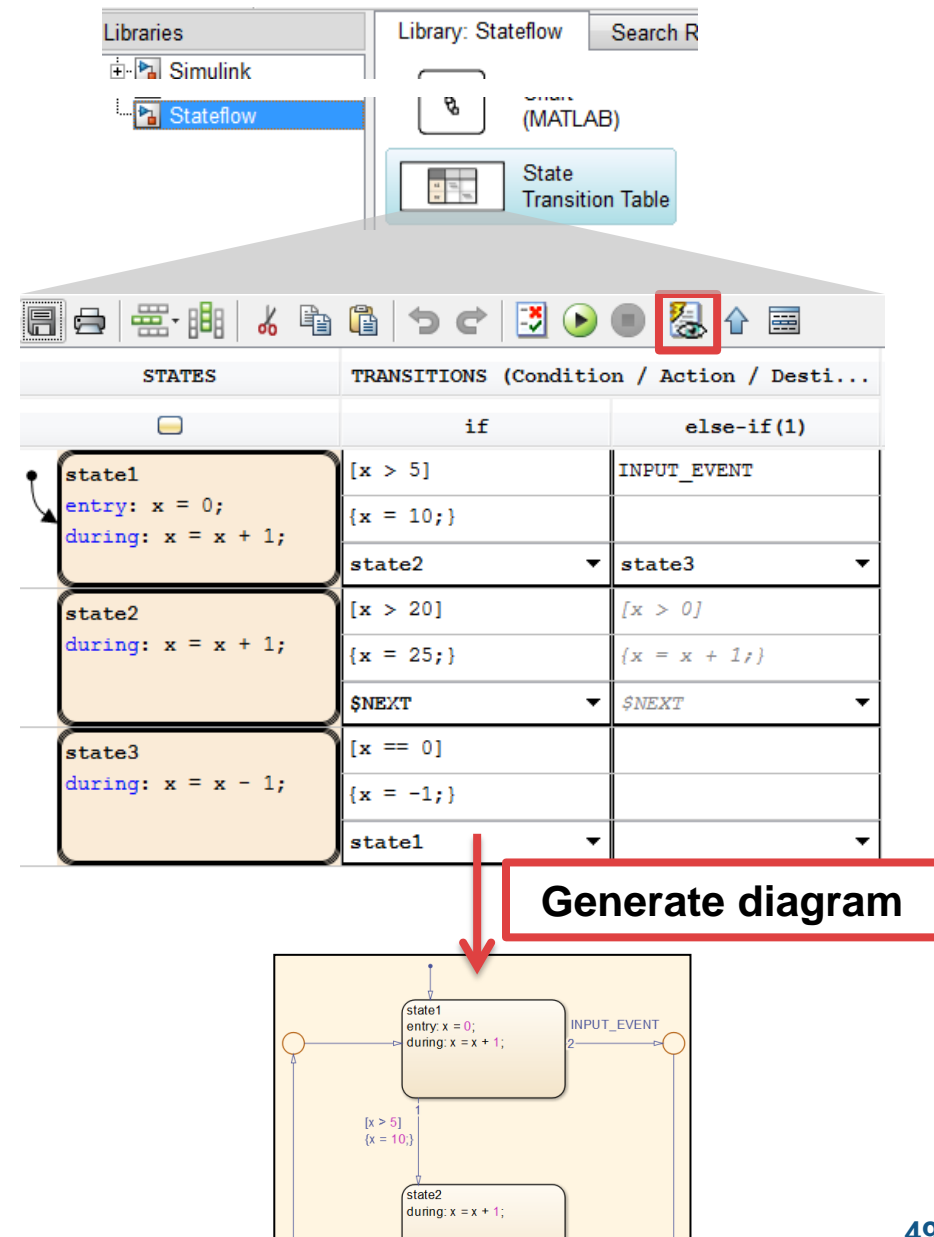


State Transition Tables

Build state machines quickly using tabular interface

- Structured interface to guide diagram construction
- Automatically complete state machine syntax
- Diagnostics identify syntax errors and incomplete transitions

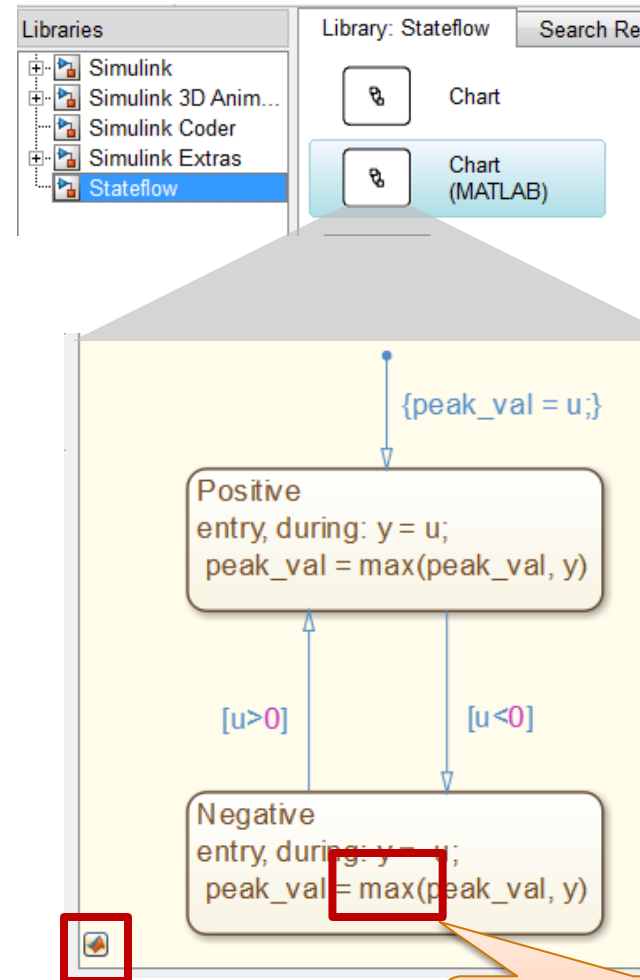
» sf_cdplayer_STT



MATLAB as the Action Language

Define state and transition labels with MATLAB language

- Call built-in and custom MATLAB functions directly in state diagram
- Automatic placement of brackets for transition labels
- Automatic inference of data size, type and complexity



Built-in MATLAB function

What's New in Simulink?

- Simulink Editor
- Smart Signal Routing
- Simulation & Analysis Tools
- Rapid Prototyping

**DISCOVER
THE NEW
LOOK AND FEEL
of
Simulink**

TRY IT TODAY
visit mathworks.com

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

MATLAB®
SIMULINK®

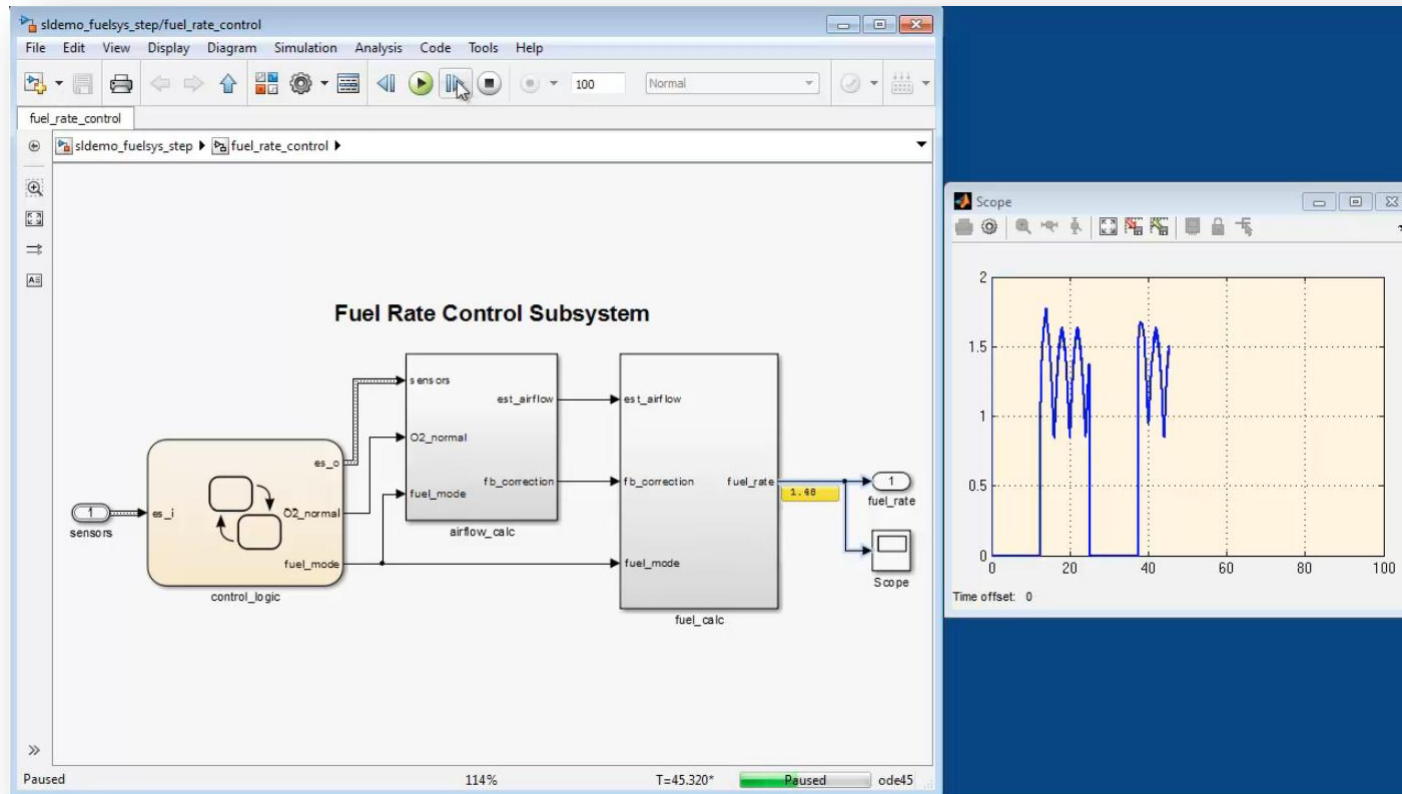


New Simulation and Analysis Tools

- Control simulation step “rewind” and “forward”
 - SIMULATION STEPPER
- Compare simulation data across simulation runs
 - SIMULATION DATA INSPECTOR
- Scan and Speed-up Simulink models
 - PERFORMANCE ADVISOR
- Access simulation data visually
 - SCOPE ENHANCEMENTS
 - PORT VALUE DISPLAYS
 - 3D VISUALIZATION (SIMULINK 3D ANIMATION)

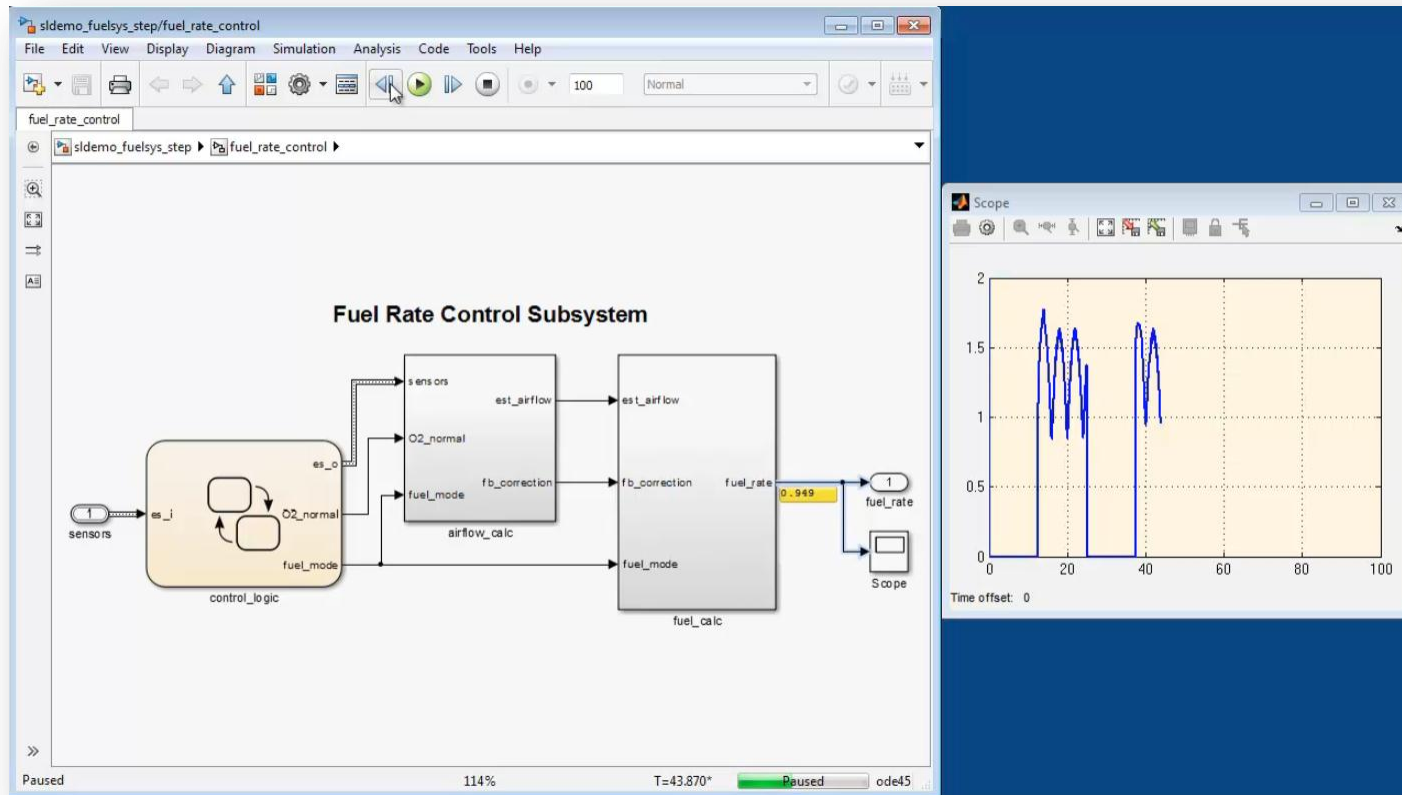
Simulation Stepper with Breakpoints

Understand the system, debug the design



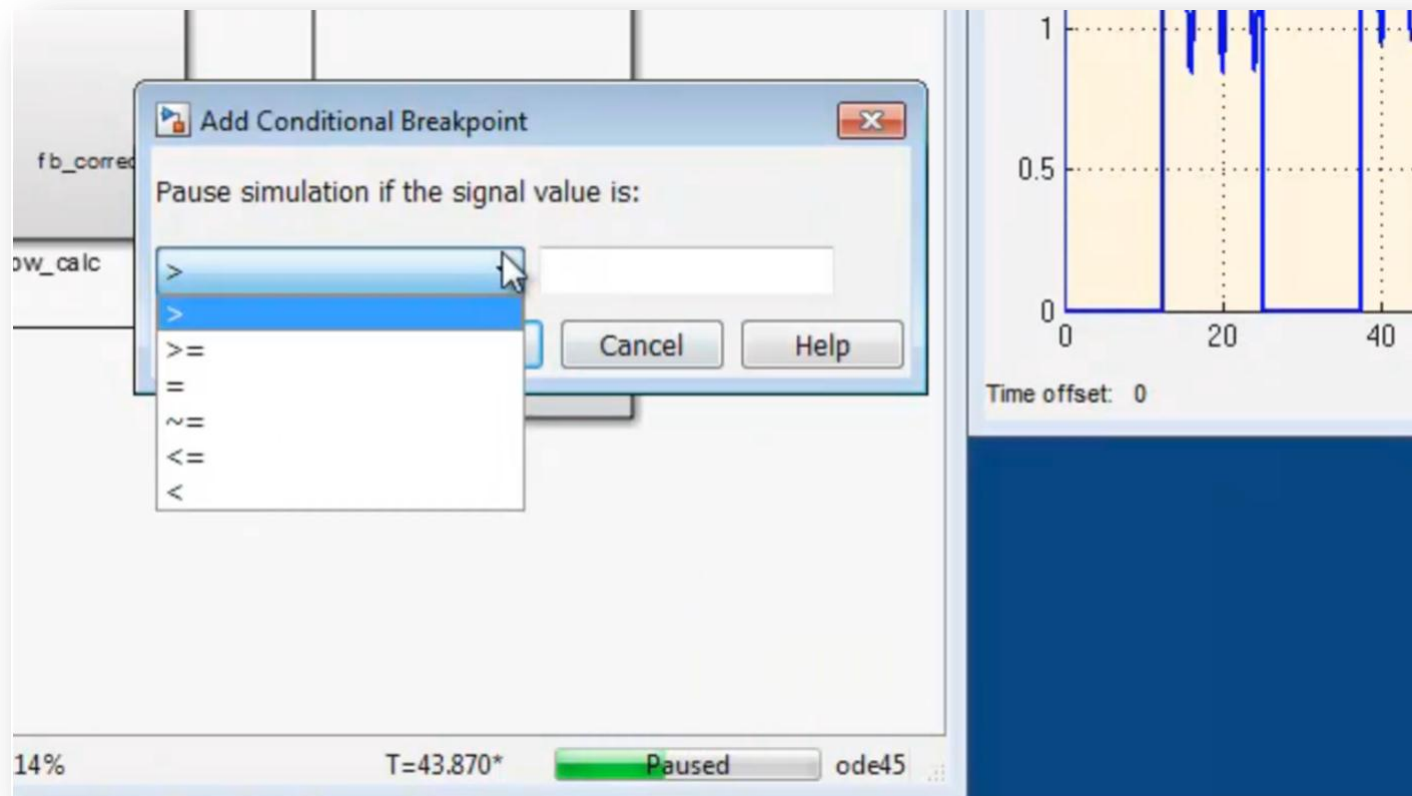
Simulation Stepper with Breakpoints

Understand the system, debug the design



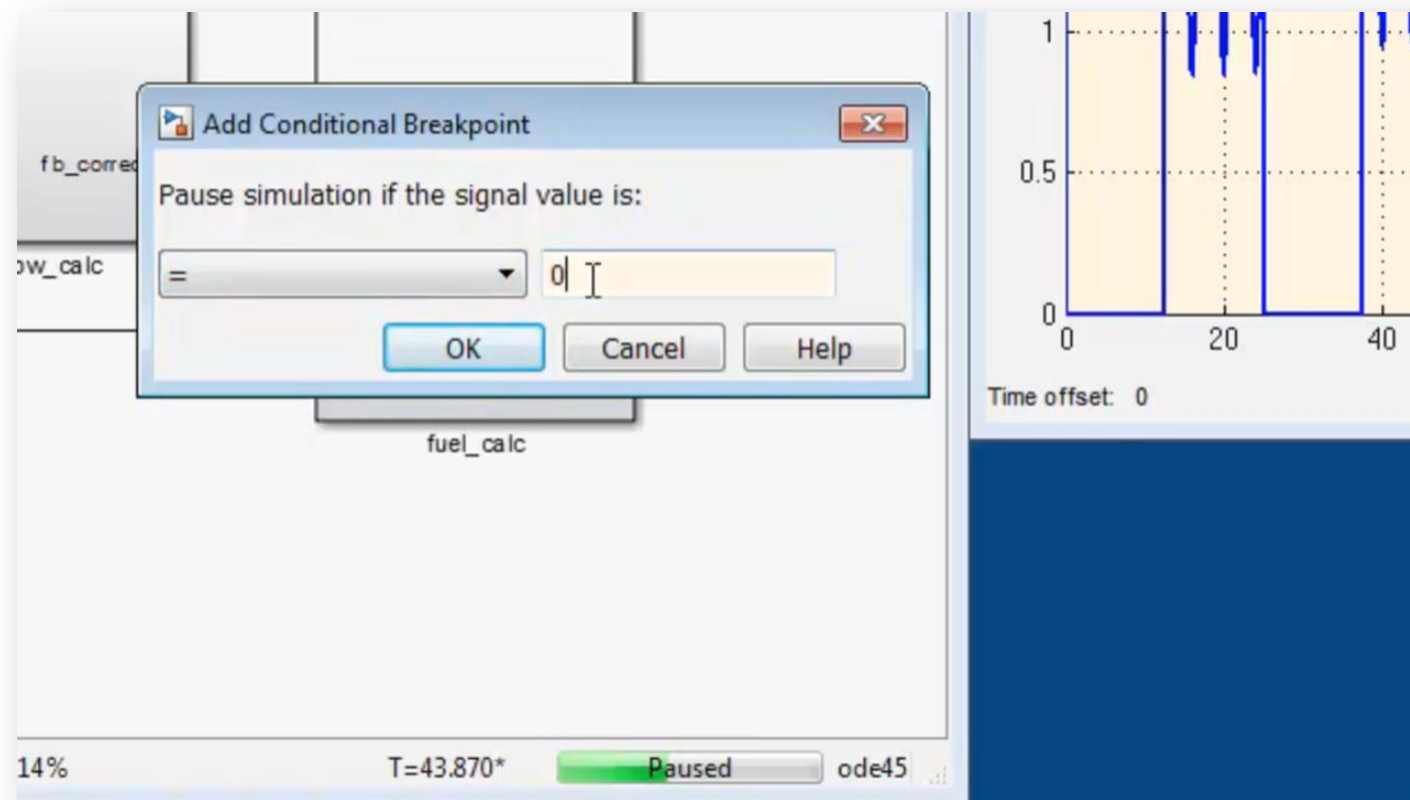
Simulation Stepper with Breakpoints

Understand the system, debug the design



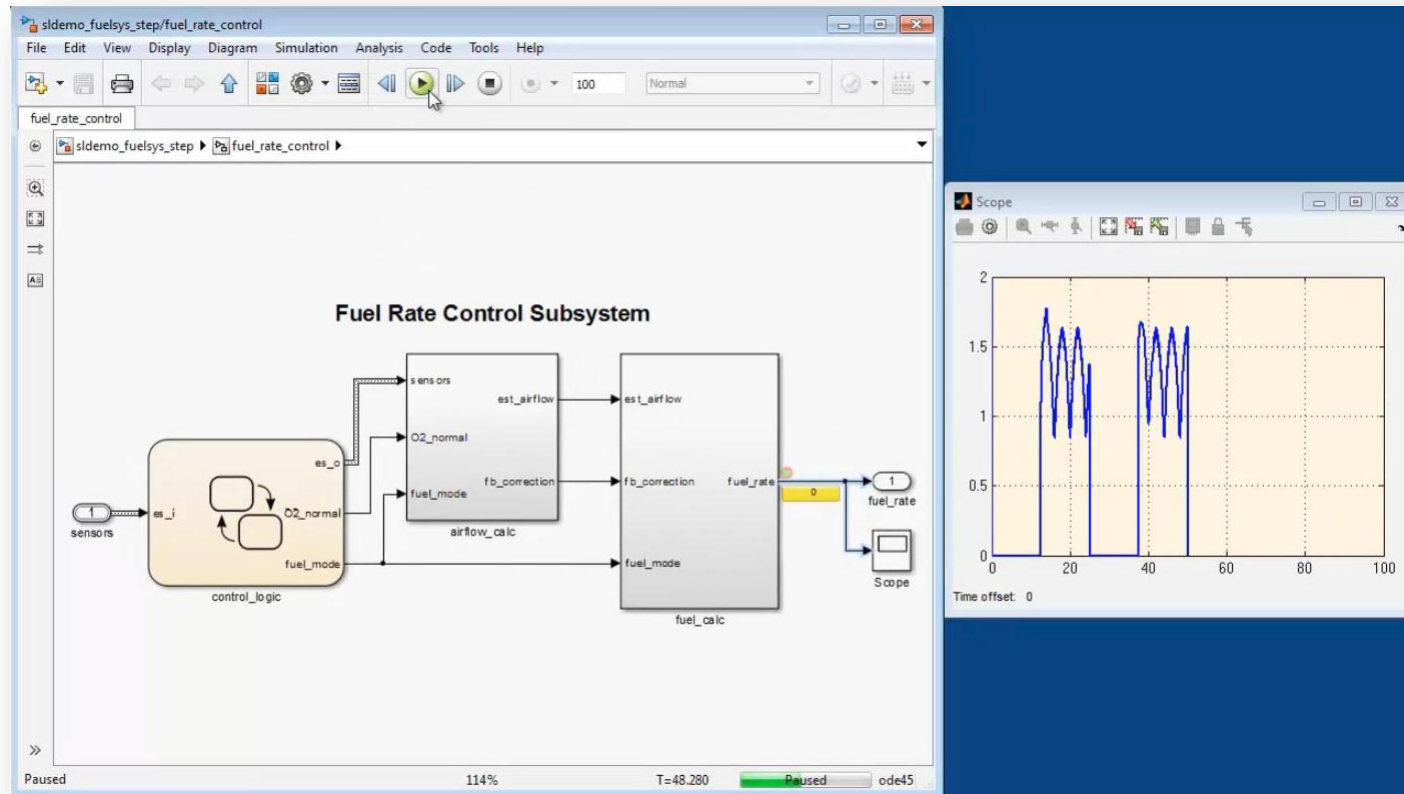
Simulation Stepper with Breakpoints

Understand the system, debug the design



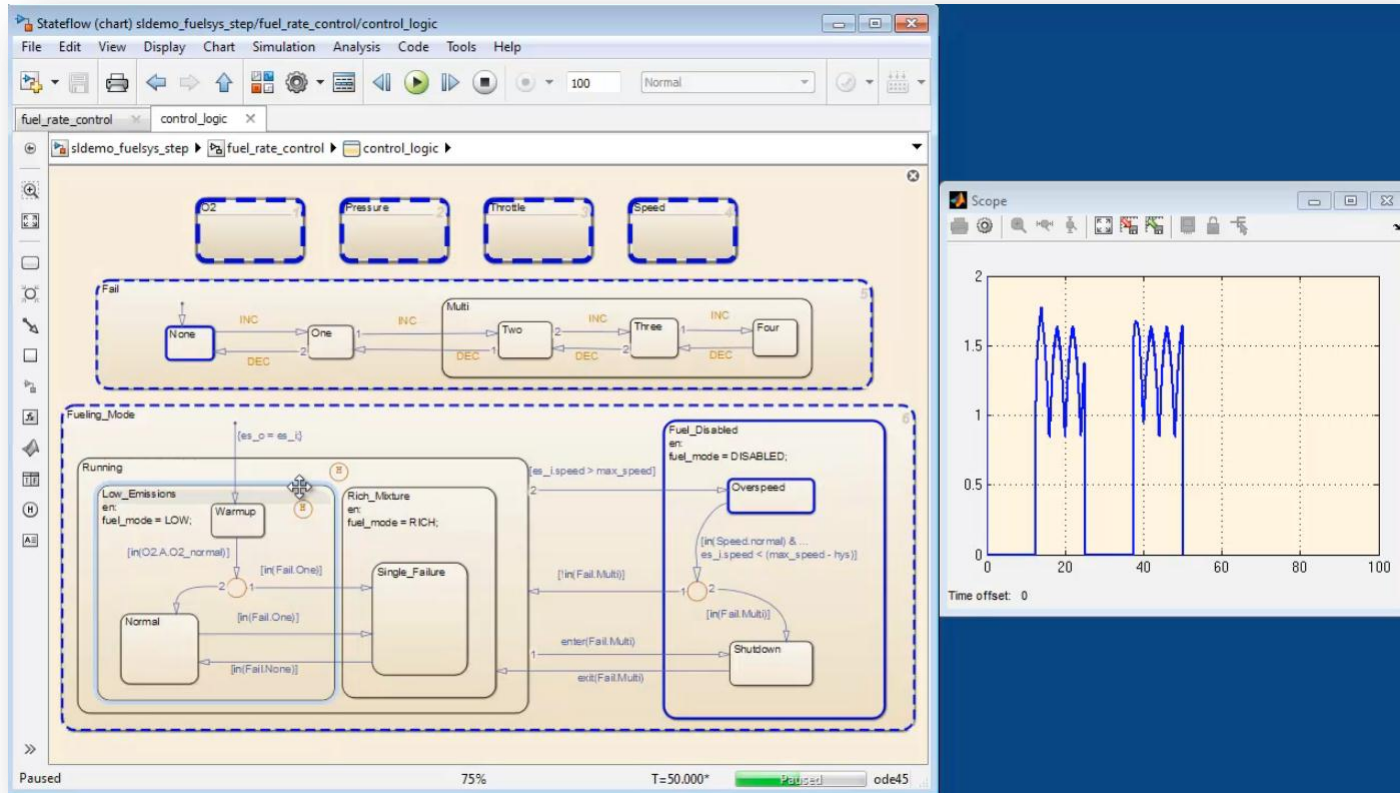
Simulation Stepper with Breakpoints

Understand the system, debug the design



Simulation Stepper with Breakpoints

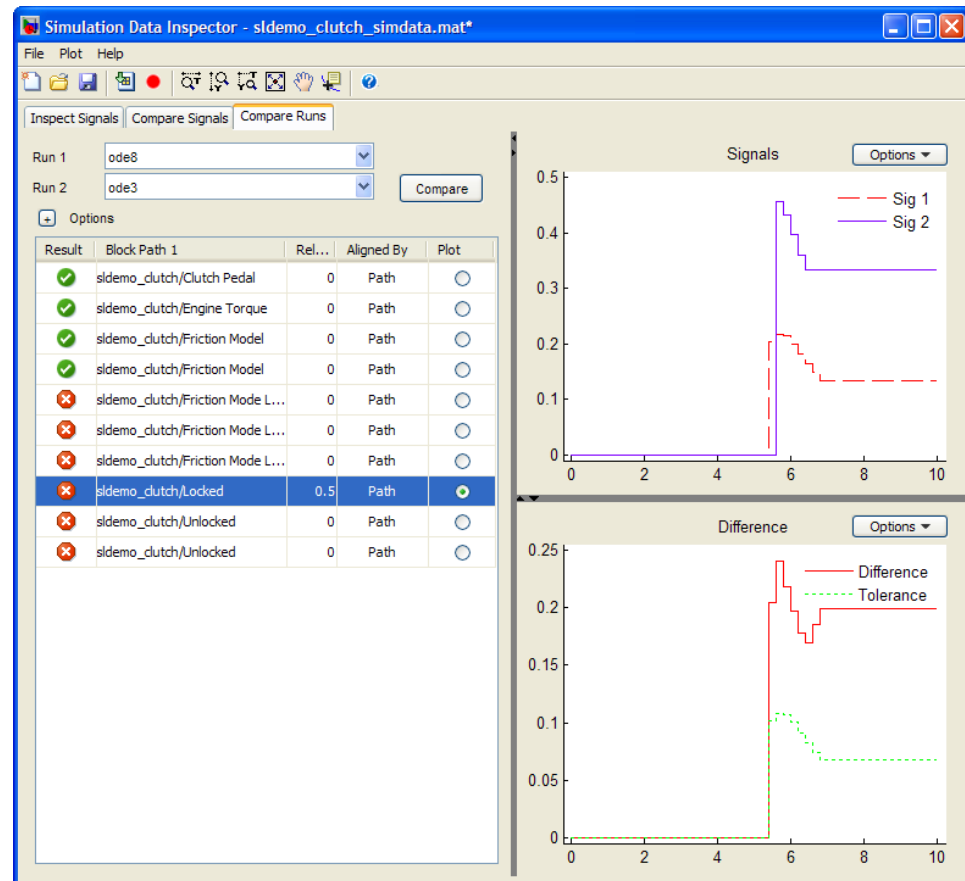
Understand the system, debug the design



Simulation Data Inspector

Quickly compare results for multiple simulation runs

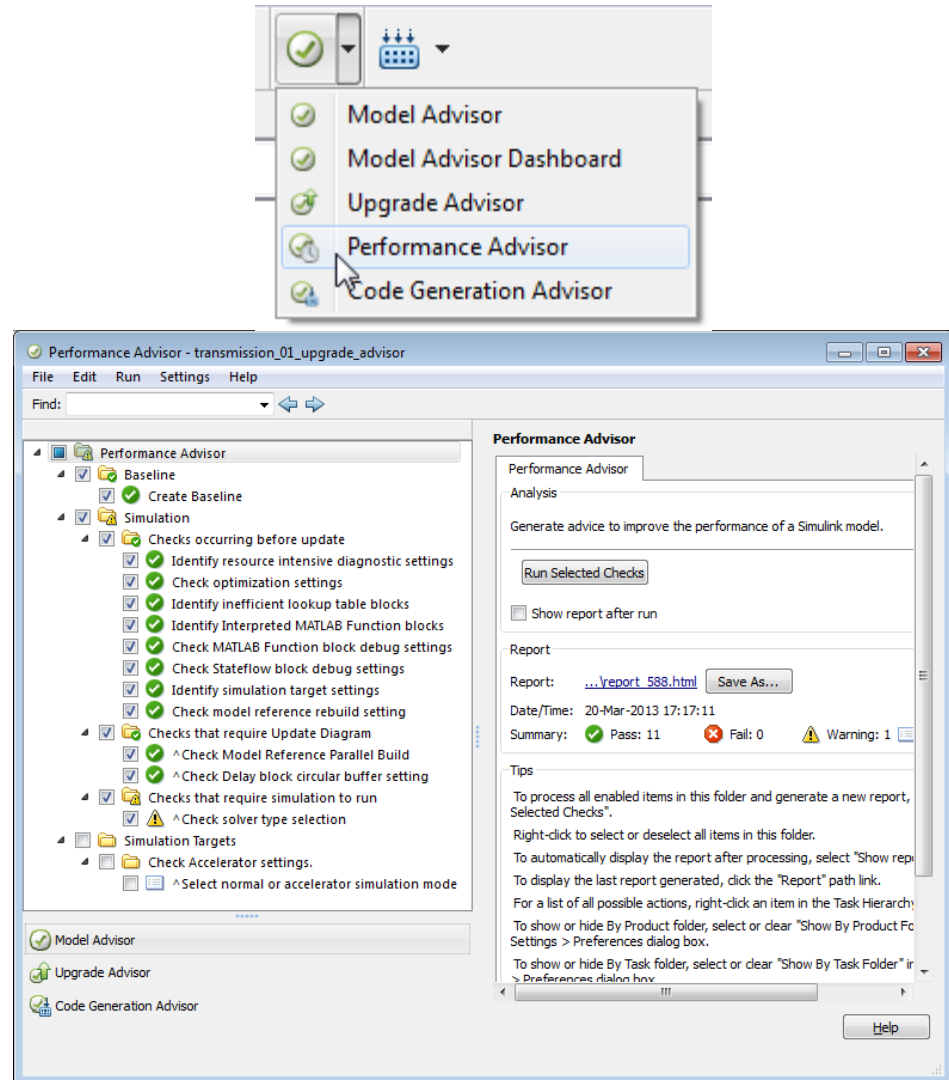
- View and compare data from multiple simulations
- Validate the generated code against simulation
- Import external data for comparison with simulation data



Performance Advisor

Speed up your simulation and update diagram performance

- Performance Advisor analyzes your model for common performance bottlenecks
- Option to automatically apply the advice you receive
- Tool verifies whether its advice does indeed speed up your model



What's New in Simulink?

- Simulink Editor
- Smart Signal Routing
- Simulation & Analysis Tools
- Rapid Prototyping

**DISCOVER
THE NEW
LOOK AND FEEL
of
Simulink**

TRY IT TODAY
visit mathworks.com

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

MATLAB®
SIMULINK®



Simulink Support for Low Cost Hardware

- Prototype on low cost hardware
- Avoid writing driver blocks
- Avoid installation issues
- Deploy smoothly

PANDABOARD



ARDUINO



BEAGLE BOARD



**LEGO
MINDSTORMS
NXT**



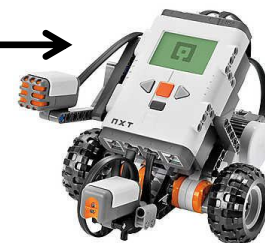
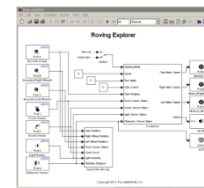
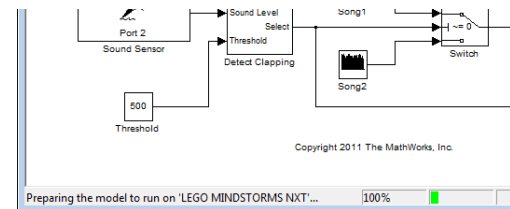
RASPBERRY PI



**GUMSTIX OVERO
HARDWARE**

Simulink Support for Low Cost Hardware

- Prototype on low cost hardware
 - BUILT-IN SUPPORT IN SIMULINK
 - ARDUINO, LEGO MINDSTORMS NXT, RASPBERRY PI
- Avoid writing driver blocks
 - HARDWARE SUPPORT PACKAGES
- Avoid installation issues
 - SUPPORT PACKAGE INSTALLER
- Deploy smoothly
 - 1-CLICK DEPLOYMENT



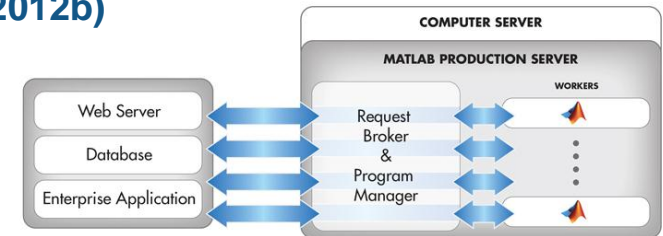
Other Updates

MATLAB Product Family


- MATLAB – xUnit-style testing framework (R2013a)
 - For writing and running unit tests, and analyzing test results

```
classdef Test1 < matlab.unittest
    methods (Test)
        function testRealSolution
            actSolution = quadra
            expSolution = [2,1];
        end
    end
end
```


- MATLAB Production Server (New product – R2012b)
 - Run MATLAB programs as a part of web, database, and enterprise applications




- Phased Array System Toolbox
 - FMCW generation and processing, MATLAB Compiler support (R2012b)
 - Polarization support, three new MATLAB apps (R2013a)



Radar Waveform Analyzer



Radar Equation Calculator



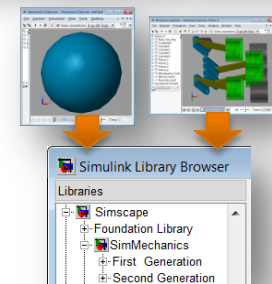
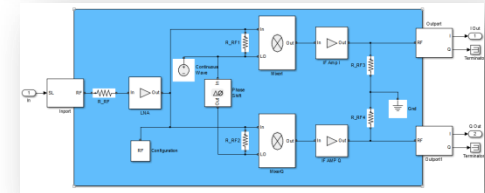
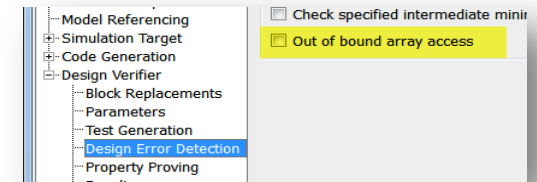
Sensor Array Analyzer

- GPU computing (R2012b)
 - Performance improvements to GPU-enabled MATLAB functions
 - More GPU-enabled functions (e.g., `convn`, `cov`, and `normest`)
 - Additional support for toolboxes
(Neural Networks Toolbox, Signal Processing Toolbox, Phased Array System Toolbox, Statistics Toolbox)

Other Updates

Simulink Product Family


- Verification and Validation (R2013a)
 - Improved Design Error Detection in Simulink Design Verifier
- RF modeling (R2013a)
 - SimRF has improved circuit envelope solver
- SimMechanics (R2012b)
 - Generate code and import CAD models with SimMechanics 2G technology
- Industry Standards Support (R2012b)
 - DO Qualification Kit and IEC Certification Kit support latest standards: DO-178C, ISO-26262, IEC 61508, EN-51028
- Fixed Point Designer (New product – R2013a)
 - Unified Fixed-Point Toolbox and Simulink Fixed Point



DO-178 Process Deployment
Advisory Service

ISO 26262 Process Deployment
Advisory Service

Learn More



Accelerating the pace of engineering and science

[United States](#) | [Contact Us](#) | [Store](#)

[Create Account](#) | [Log In](#)

[Products & Services](#) | [Solutions](#) | [Academia](#) | [Support](#) | [User Community](#) | [Events](#) | [Company](#)

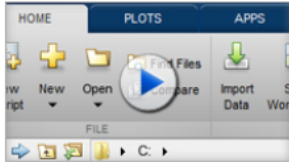
[Products & Services](#) > [MATLAB](#) > [New Features](#)



New Features

R2012b

Version 8.0, Released 11 Sep 2012



What's New in MATLAB R2012b 1:16

R2012b introduces a fresh new MATLAB Desktop, making it easier to find and access commonly used functionality.

[Download this release](#)


[Renew SMS](#)
[Get Trial Software](#)
[Buy Online](#)

» See release highlights for all products




New MATLAB Desktop 5:19

See the new MATLAB Desktop, featuring a toolstrip that organizes commonly used functionality, and a gallery of pre-built MATLAB apps.



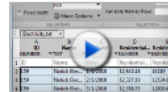
Packaging and Installing MATLAB Apps 2:58

Package your application as a single file for distribution and installation into the MATLAB apps gallery.



Redesigned Help 5:43

Explore the redesigned Help with improved browsing, searching, and filtering. Access the documentation within the MATLAB Desktop, or via the online Documentation Center.




Import Tool Enhancements for Text Files 6:21

Interactively import delimited and fixed-width text files with improved handling of numbers, text, and dates.

<http://www.mathworks.com/products/matlab/whatsnew.html>

Learn More


Accelerating the pace of engineering and science

United States | Contact Us | Store

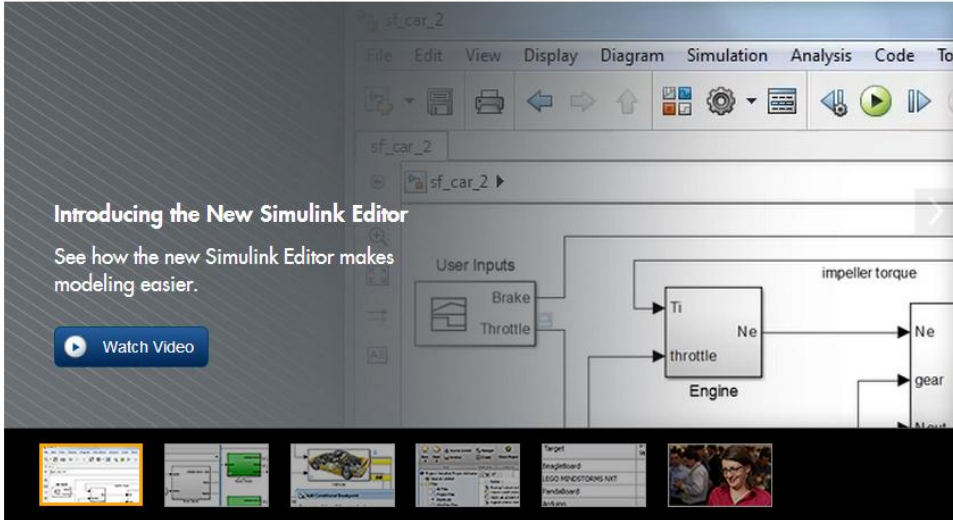
[Create Account](#) | [Log In](#)

[Products & Services](#)
[Solutions](#)
[Academia](#)
[Support](#)
[User Community](#)
[Events](#)
[Company](#)

[Products & Services](#) > [Simulink](#) > [New Features](#)

SIMULINK

[Share](#)



Introducing the New Simulink Editor

See how the new Simulink Editor makes modeling easier.

[Watch Video](#)

R2013a

[Download this release](#)
[Renew SMS](#)
[Get Trial Software](#)
[Buy Online](#)

» [See release highlights for all products](#)

New Features By Release

R2013a (Version 8.1) - Released 7 Mar 2013

New Simulink Editor

- Reordering of tabs in tabbed windows
- Scalable vector graphics for mask icons

Component-Based Modeling

Project and File Management

- Simplified scripting interface for automating Simulink Project tasks
- Option to use elements from multiple templates when creating a new project



Q&A