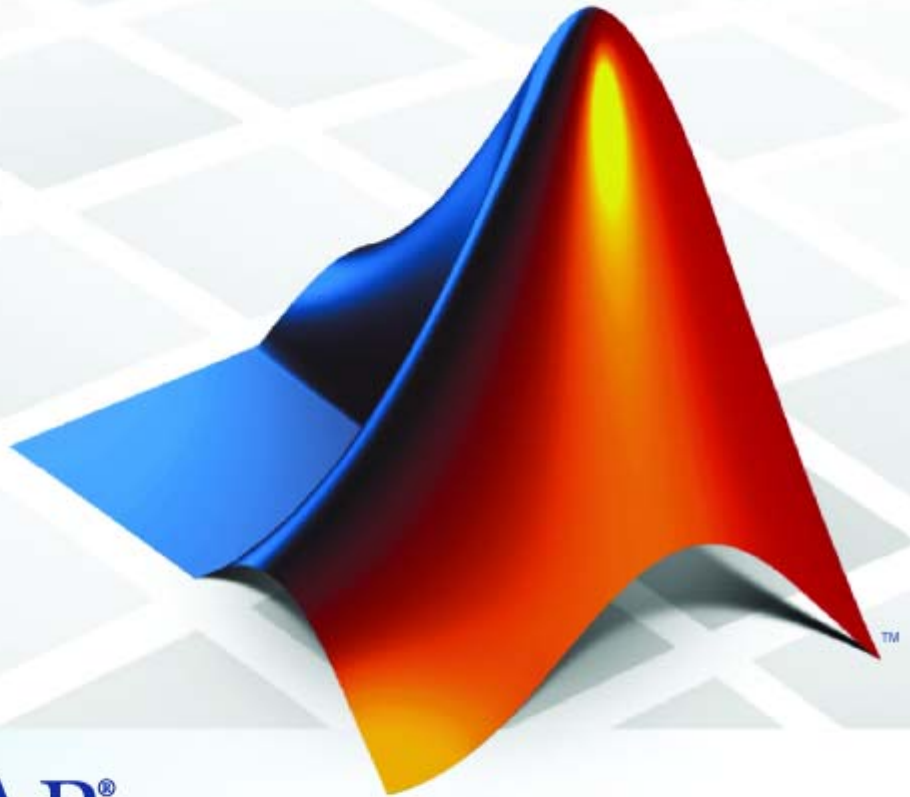


MATLAB® & Simulink®

Release Notes for R2009a



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Release Notes for R2009a

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Revision History

March 2009 Online only New for Release 2009a

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Highlights of R2009a

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What’s New in Release 2009a

R2009a includes new features in MATLAB® and Simulink®, 2 new products, and updates and bug fixes to 91 other products. Subscribers to MathWorks™ Software Maintenance Service can download product updates. Since R2008a, the MATLAB and Simulink product families require activation. R2009a also includes enhancements to the License Center, the online tool for activating software and managing license and user information.

New capabilities added to the PolySpace code verification products, include JSF C++ (JSF++) standards checking, multicore acceleration and Eclipse integration.

New Capabilities for the MATLAB Product Family

- Multicore support for `fft` and other MATLAB functions
- Utilization of eight cores on your desktop with Parallel Computing Toolbox™
- Ability to use .NET classes directly in MATLAB programs and applications
- Surface fitting, including surface fit objects and a new GUI in Curve Fitting Toolbox™
- Generation of Simulink blocks from symbolic math expressions in Symbolic Math Toolbox™

- Support for population pharmacokinetic (PK) modeling in SimBiology[®], using nonlinear mixed effects (NLME) models
- Vehicle Network Toolbox[™], a new product for communicating with in-vehicle networks using CAN protocol

New Capabilities for the Simulink Product Family

- Ability to save, restore, and restart simulation states in Simulink and Stateflow[®]
- Fixed-point support for Discrete Filter block and autoscaling of Simulink data objects in Simulink[®] Fixed Point[™]
- Configuration and generation of code based on high-level objectives, such as efficiency and traceability in Real-Time Workshop[®] Embedded Coder[™]
- Reduced RAM usage, faster execution time and other code efficiency improvements in Real-Time Workshop[®] and Real-Time Workshop Embedded Coder
- Simulink[®] Design Optimization[™], a new product for estimating and optimizing Simulink model parameters

New Products

R2009a contains two new products.

Product Name	Description
Simulink Design Optimization (transitioned from Simulink [®] Parameter Estimation [™] and Simulink [®] Response Optimization [™])	Estimate and optimize Simulink model parameters
Vehicle Network Toolbox	Communicate with in-vehicle networks using CAN protocol

For details, see “New Products” on page 1-31.

Products with License-Related Changes

There are six products that have license-related changes in R2009a.

For details, see “R2009a Products with License-Related Changes” on page 1-33.

Summary of Changes to Each Product

See “Release Summary” on page 1-41 for a summary of what has changed for each product for R2009a, including whether the product has new features, bug fixes, and compatibility issues.

Summary of New Features

Note For information about potential issues for upgrading from R2008b, see “Compatibility Considerations” on page 1-35.

This section summarizes the major new features and enhancements introduced in R2009a for the following products:

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MATLAB 7.8

Development Environment

- Expanded M-Lint code-checker messages, providing more detailed explanations of warnings and errors within the MATLAB Editor

Mathematics

- Significant enhancements to computational geometry functionality, providing improved robustness and memory efficiency for Delaunay triangulation and scattered-data interpolation

File I/O and External Interfacing

- Ability to call .NET classes from MATLAB, providing direct access to a wide variety of software components
- Expanded mmreader multimedia reader support for Linux® platforms

Platform, Performance, and Large Data Set Handling

- Multithreaded computation support for fft, sum, prod, min, and max

For details, see the product-specific release notes.

Simulink 7.3

Simulation Performance

- Ability to save, restore, and restart the complete simulation state using the SimState feature
- Ability to save Simulink Profiler results for subsequent viewing

Component-Based Modeling

- Ability to display port values during simulation for referenced models in Normal mode
- Parallel builds enabling faster update diagram times for large model reference hierarchies when configured in Accelerator Mode (requires Parallel Computing Toolbox)

Embedded MATLAB

- Support for enumerated data types in Embedded MATLAB™ Function blocks
- Support for Basic Linear Algebra Subroutines (BLAS) libraries to speed up low-level matrix operations in simulation

Data Management

- Ability to specify custom storage class on the Signal Properties dialog box without creating a Simulink signal object in the workspace

File Management

- Ability to specify a project root folder in the Simulink manifest, making manifests easier to share, compare, and read

Block Enhancements

- Support for parameter data types different from signal data types in Prelookup and Interpolation Using Prelookup blocks
- Lookup Table (n-D) and Interpolation Using Prelookup blocks now performing more efficient fixed-point interpolations
- Lookup Table (n-D) block now supporting faster calculation of index and fraction for power of 2 evenly spaced breakpoint data
- Discrete Filter block now supporting fixed-point data types
- MinMax block now performing more efficient and accurate comparison operations for mixed floating-point and fixed-point data types

User Interface Enhancements

- Ability to customize the Library Browser by adding, hiding, or disabling menu items and selecting which libraries and blocks appear in the browser
- New Smart Guides option facilitating dynamic block alignment when editing a block diagram
- Physical port rotation option for masked blocks to synchronize port rotation with block rotation and enable new Flip Block Up-Down and Left-Right options
- New block rotation option to rotate counter clockwise
- New programmatic methods for creating subsystems from selected blocks and accessing the compiled block sample time data, color, and annotations

- New option to print the Sample Time Legend from the legend or from the block diagram print dialog box
- Enhanced status bar progress indicator now showing additional information during update diagram for Windows® platforms

For details, see the product-specific release notes.

Aerospace Blockset 3.3

- Ability to save, restore, and restart the complete simulation state using the SimState feature

For details, see the product-specific release notes.

Aerospace Toolbox 2.3

- Support for reading file type 21 for the 2007 version of Datcom

For details, see the product-specific release notes.

Bioinformatics Toolbox 3.3

- Expanded functionality of mass spectrometry functions for use with other bioanalytic separation techniques such as NMR, electrophoresis, chromatography, and spectroscopy
- Ability to read Illumina microRNA array annotation and data files
- New function to visualize results from microplate
- Expanded array comparative genomic hybridization (aCGH) analysis with heuristic stopping rule
- Expanded functionality for converting nucleotide sequences to amino acid sequences with support for ambiguous characters

For details, see the product-specific release notes.

Communications Blockset 4.2

- New Orthogonal Space-Time Block Coding Combiner and Encoder blocks, providing capability to design multiple-input multiple-output (MIMO) systems
- Ability to visualize a signal constellation from the block mask dialog box in linear modulator blocks
- Enhanced fixed-point blocks include convergent, round, and simplest rounding methods
- Support for zero and ceiling rounding modes in M-PAM, R-QAM, and OQPSK demodulator blocks
- Support for bell-shaped Doppler spectrum in Fading Channel blocks

For details, see the product-specific release notes.

Communications Toolbox 4.3

- Error Vector Magnitude (EVM) measurements, providing performance evaluation in the presence of signal impairments
- Modulation Error Ratio (MER) measurements, providing signal-to-noise (SNR) evaluation for digital modulation methods
- New scope for scatter plot visualizations
- Support for multiple-input multiple-output (MIMO), providing spatial correlation between channels
- Support for pseudo-noise sequence generator functionality in the `commsrc` package

For details, see the product-specific release notes.

Curve Fitting Toolbox 2.0

- New flexible graphical user interface for fitting and plotting surfaces and analyzing goodness of fit
- Automatic MATLAB code generation for surface fits and plots from the surface fitting GUI
- Storage of results from a fitting operation in surface fit objects, making it easy to plot and analyze fits at the command line
- Four types of surface fitting algorithms: linear regression, nonlinear regression, smoothing, and interpolation

For details, see the product-specific release notes.

Data Acquisition Toolbox 2.14

- Support for additional National Instruments data acquisition devices, including: USB-9234, USB-6521, PXI-6521, ENET-9211, ENET-9215, ENET-9219, ENET-9234, WLS-9211, WLS-9215, WLS-9219, and WLS-9234
- Support for the Measurement Computing Corporation USB-DIO24H/37 data acquisition device

For details, see the product-specific release notes.

Datafeed Toolbox 3.3

- Web access to data provided via the Reuters Datascope Tick History service
- Data type support for Kx Systems[®], Inc. kdb+
- RFA 6 support for Reuters[®] Market Data System
- Support for Haver Analytics data aggregation

For details, see the product-specific release notes.

Econometrics Toolbox 1.1

- Support for structural multiple time series models, including structural VAR, VARX, and VARMAX models
- New Lagrange multiplier and Wald tests for model misspecification
- Enhanced likelihood ratio testing for multiple model comparisons

For details, see the product-specific release notes.

EDA Simulator Link MQ (for Mentor Graphics ModelSim) 2.6

- New demos: SystemC™ Cosimulation with Simulink and MATLAB Algorithms, and SystemC™ Cosimulation with Simulink and MATLAB Test Benches

For details, see the product-specific release notes.

Embedded IDE Link CC (for TI Code Composer Studio) 3.4

- Target function library support for multiply extended to new data types on C6000™ processors
- Ability to replace any generated file in a project with a custom file

For details, see the product-specific release notes.

Embedded IDE Link MU (for Green Hills MULTI) 1.2

- Ability to replace any generated file in a project with a custom file
- New fuel system demo

For details, see the product-specific release notes.

Embedded IDE Link TS (for Altium TASKING) 1.4

- Support for Model block processor-in-the-loop (PIL)

For details, see the product-specific release notes.

Embedded IDE Link VS (for Analog Devices VisualDSP++) 2.2

- Ability to replace any generated file in a project with a custom file
- New fuel system demo

For details, see the product-specific release notes.

Filter Design HDL Coder 2.4

- Ability to generate a Simulink model for cosimulation of generated HDL code
- Support for complex input data and coefficients for FIR and CIC filters
- Support for programmable coefficients for IIR and serial implementations for single-rate FIR filters

For details, see the product-specific release notes.

Filter Design Toolbox 4.5

- New peaking and notching IIR comb filters in `fdesign`
- New maximum phase option for equiripple designs (Low Pass, High Pass, Band Pass, Band Stop) in `fdesign`
- Support for round and convergent rounding modes in `realizemdl/block` methods and `filterbuilder` GUI wizard

For details, see the product-specific release notes.

Financial Derivatives Toolbox 5.4

- Support for European digital options using the Black-Scholes pricing model
- Support for European rainbow options using the Stulz option pricing model
- Support for caps and floors using the Black option pricing model
- Support for calibrating the Hull-White model using market data of caps and floors

For details, see the product-specific release notes.

Financial Toolbox 3.6

- Support for key rate duration for bonds

For details, see the product-specific release notes.

Fixed-Point Toolbox 2.4

- New compilation report that shows how `emlc` and `emlmex` specify and propagate MATLAB data types
- New `Signedness` property of the `numerictype` object that allows creation of `numerictype` objects with unspecified sign
- New Fixed-Point Toolbox™ menu in the MATLAB Editor that provides GUIs for inserting `fi`, `fimath`, and `numerictype` object constructors in M-files
- New `mrdivide` and `rdivide` functions for fixed-point division

For details, see the product-specific release notes.

Image Acquisition Toolbox 3.3

- Support for 64-bit versions of Windows for the NI, Hamamatsu, QImaging, and Winvideo adaptors
- Minor enhancements to Image Acquisition Tool, including ability to register third-party adaptors

For details, see the product-specific release notes.

Image Processing Toolbox 6.3

- Faster, less memory-intensive workflow for labeling regions and measuring their properties in binary images
- Multithreaded implementation of `imfilter` function
- Efficient display and navigation of very large TIFF files in `imtool`
- New dialog box for setting toolbox preferences

For details, see the product-specific release notes.

Instrument Control Toolbox 2.8

- Expanded platform support

For details, see the product-specific release notes.

MATLAB Builder EX 1.2.12 (for Microsoft Excel)

- Enhanced `readme.txt` file customized to MATLAB® Builder™ EX deployment requirements and generated with each build

For details, see the product-specific release notes.

MATLAB Builder JA 2.0.3 (for Java language)

- Enhanced `readme.txt` file customized to MATLAB Builder JA deployment requirements and generated with each build
- Ability to specify run-time options `-nojvm`, `-logfile`, and `-nodisplay` to the MATLAB Compiler Runtime (MCR)
- Enhanced Javadoc, including additional essential information for Java™ developers

For details, see the product-specific release notes.

MATLAB Builder NE 3.1

- Enhanced `readme.txt` file customized to MATLAB Builder NE deployment requirements and generated with each build
- Ability to specify run-time options `-nojvm` and `-logfile` to the MATLAB Compiler Runtime (MCR)

For details, see the product-specific release notes.

MATLAB Compiler 4.10

- Support for compiling MATLAB prepared pseudocode files (P-code files or P-files)
- Support for Microsoft® Visual Studio Express compilers (32-bit and 64-bit versions)
- Enhanced `readme.txt` file customized to MATLAB® Compiler™ deployment requirements and generated with each build

For details, see the product-specific release notes.

MATLAB Distributed Computing Server 4.1

- Increased number of local workers that can run on a MATLAB client computer using Parallel Computing Toolbox
- Support for Microsoft Windows HPC Server 2008 (CCS v2)
- Enhanced Admin Center with graphical user interface for starting and stopping job manager and worker processes

For details, see the product-specific release notes.

Model Predictive Control Toolbox 3.1

- New sensitivity analysis that provides guidance on changing weights for tuning MPC controllers

For details, see the product-specific release notes.

Optimization Toolbox 4.2

- Expanded parallel computing support that includes forward and central finite differences in `fmincon` interior-point algorithm
- Enhanced exit messages in selected solvers with links for obtaining more information

For details, see the product-specific release notes.

Parallel Computing Toolbox 4.1

- Increase in the number of local workers (from 4 to 8) supported by Parallel Computing Toolbox
- Support for Microsoft Windows HPC Server 2008 (CCS v2)
- Enhanced Admin Center with graphical user interface for starting and stopping job manager and worker processes

For details, see the product-specific release notes.

PolySpace Products

PolySpace Client for C/C++ 7.0

- Support for all checkable JSF++ rules
- New back-to-source link that associates compile errors, MISRA C violations, and JSF++ violations directly to source
- Integration of PolySpace® products with the Eclipse™ IDE
- Code verification time reduction on multicore computers

PolySpace Model Link SL 5.3

- New option to launch PolySpace software directly from Simulink

For details, see the product-specific release notes.

Real-Time Windows Target 3.3

- Support for Vector CAN boards
- Support for counter and encoder blocks for National Instruments® 62XX boards

For details, see the product-specific release notes.

Real-Time Workshop 7.3

- Parallel builds that accelerate code generation and compilation for large model reference hierarchies (requires Parallel Computing Toolbox)
- External simulation support for parameter and signal values with data types larger than 32 bits
- Ability to multiplex compatible asynchronous function calls
- Open Watcom compiler support for model reference builds

- Compilation report that shows how emlc specifies and propagates data types from MATLAB to generated code

For details, see the product-specific release notes.

Real-Time Workshop Embedded Coder 5.3

- Ability to automatically establish settings, identify changes, and generate code based on high-level objectives, such as efficiency and traceability
- Support for specification of custom storage classes on signals without the need of a Simulink signal object
- Enhanced code efficiency, including reduced signal copies for reusable subsystems and referenced models, and reduced RAM usage and execution time for selector and assignment blocks
- Processor-in-the-loop support for tunable parameters and serial communication
- AUTOSAR support for schema version 3.0
- C++ encapsulation interface support expanded to referenced models

For details, see the product-specific release notes.

RF Blockset 2.4

- Enhanced Input Port block, with option for interpreting the Simulink signal as the incident power wave
- Enhanced Coaxial Transmission Line, Two-Wire Transmission Line, and Parallel-Plate Transmission Line blocks, with more realistic model for dielectric loss

For details, see the product-specific release notes.

RF Toolbox 2.5

- Enhanced `rfckt.coaxial`, `rfckt.twowire`, and `rfckt.parallelplate` objects, with more realistic model for dielectric loss

- New `s2smm` function for converting 4N-port single-ended S-parameters to 2N-port mixed-mode S-parameters
- New `smm2s` function for converting 2N-port mixed-mode S-parameters to 4N-port single-ended S-parameters
- Two new demos that show how to design a broadband impedance matching network for an antenna and an amplifier

For details, see the product-specific release notes.

Signal Processing Blockset 6.9

- Zoom capability added to Spectrum Scope and Vector Scope blocks
- Enhanced code generation that eliminates the need for additional libraries by including minimal required functions in the build directory
- Enhanced Variable Fractional Delay block that includes Farrow mode, new algorithmic options, and fixed-point support
- Enhanced Biquad Filter block that accepts filter coefficients via an input port
- New Audio Parametric Equalizer demo, showing a design workflow that includes a custom GUI for exploration and algorithmic code generation

For details, see the product-specific release notes.

Signal Processing Toolbox 6.11

- New, more robust filter design approach using `fdesign` objects and `filterbuilder` GUI (Advanced design methods and filter responses available in Filter Design Toolbox™)
- Enhanced `dfilt` block method with new option to specify filter coefficients via block ports

For details, see the product-specific release notes.

SimBiology 3.0

- Functionality for fitting data and estimating parameters using nonlinear mixed effects
- New pharmacokinetics (PK) wizard for automatically generating PK models by specifying compartment number, route of administration, and method of elimination
- New diagnostic plots for individual and population fitting results
- Ability to import, visualize, and perform statistical analysis on clinical and experimental data

For details, see the product-specific release notes.

SimElectronics 1.2

- New Piezo Linear Motor and Piezo Rotary Motor blocks added to the Actuators & Drivers library
- New Crystal, Resistor, and Current- and Voltage-Controlled Switch blocks added to the Passive Devices Library
- New two-input controlled source blocks added to the SPICE-Compatible Sources library
- Enhanced Solar Cell block with optional detailed model
- Enhanced NMOS and PMOS blocks to support SPICE Level 3

For details, see the product-specific release notes.

SimEvents 2.4

- New debugger, providing MATLAB functions to pause a simulation at each step or breakpoint, and query simulation behavior

For details, see the product-specific release notes.

SimHydraulics 1.5

- Five new blocks that incorporate elevation information to enable additional applications, such as low-pressure fluid transportation system simulation

For details, see the product-specific release notes.

SimMechanics 3.1

- Support for Autodesk® Inventor in the SimMechanics™ Link utility

For details, see the product-specific release notes.

SimPowerSystems 5.1

- Powergui tools available as standalone command-line functions
- Enhanced Ideal Switching mode to expose circuit differential equations
- Enhanced Battery block that accurately represents the battery dynamics during the charge and discharge processes

For details, see the product-specific release notes.

Simscape 3.1

- Ability to protect Simscape™ language files, enabling model sharing without disclosing the component or domain source code
- Support in the MATLAB Editor for syntax highlighting of Simscape files
- Viewable and customizable Simscape language source files for many Foundation library components
- Three new Physical Signal blocks that facilitate rounding
- Ability to use Model Reference Accelerator Mode for simulation in Simscape and its vertical products

For details, see the product-specific release notes.

Simulink Control Design 2.5

- Ability to generate MATLAB code from the GUI for programmatically creating operating points and linearizing models
- Ability to tune blocks already discretized using the Model Discretizer
- Ability to tune blocks in the Simulink Extras library that specify initial states or outputs
- New option for labeling bus signal I/O names in linearization results

For details, see the product-specific release notes.

Simulink Design Optimization 1.0

- New parallel computing support for estimating parameters of Simulink models

For details, see the product-specific release notes.

Simulink Design Verifier 1.4

- Support for Model blocks that reference other models
- Automatic stubbing, enabling partial analysis for models that include unsupported operations, such as S-functions and C math operations
- Support for models containing the Combinatorial Logic, Integer Delay, Prelookup, and Relay blocks
- Support for models that call external Embedded MATLAB functions
- Optimization of long test cases by combining test objectives into fewer test vectors and more time steps
- Improved examples and demonstrations for property proving

For details, see the product-specific release notes.

Simulink Fixed Point 6.1

- Discrete Filter block now supporting fixed-point data types
- Prelookup and Interpolation Using Prelookup blocks now supporting parameter data types that differ from signal data types
- Autoscaling support for Simulink signal objects using Fixed-Point Advisor and Fixed-Point Tool
- New rounding modes `convergent` and `round` added to multiple blocks, enabling numerical agreement with embedded hardware and MATLAB results
- Expanded support for simplest rounding mode that maximizes efficiency for blocks that handle mixed floating-point and fixed-point data types
- Multiword generated code enhancements, including more efficient reuse of temporary variables

For details, see the product-specific release notes.

Simulink HDL Coder 1.5

- HTML Code Generation Report that provides bidirectional linkage between Simulink model and generated code
- Support for additional Simulink blocks for HDL code generation, including Enabled Subsystem, Biquad Filter, Increment/Decrement, From and Goto blocks
- Support for Distributed Arithmetic architecture for FIR structures of Digital Filter block

For details, see the product-specific release notes.

Simulink Report Generator 3.6

- New Sample Time Legend for Print Details dialog box in Simulink Editor
- New Simulink Sample Time Component that enables documentation sample times for multirate models

- Enhanced user interfaces for Simulink Snapshot and Stateflow Snapshot components
- Speed improvement in the generation of HTML tables in reports

For details, see the product-specific release notes.

Simulink 3D Animation 5.0

- Integration of virtual scene viewer in MATLAB figures, enabling combination of virtual scenes and Handle Graphics® objects, multiple views of a virtual world, and views of different virtual worlds
- Enhanced vrplay function that contains virtual scene and player controls in a single MATLAB figure window
- New function to process VRML files created by CAD tools for use with Simulink® 3D Animation™ environment
- New function to automatically add a Simulink 3D Animation scene to SimMechanics models created from CAD tools
- Support for virtual scenes to open automatically when a model opens, even if the associated Simulink 3D Animation block is contained in a subsystem of the model

For details, see the product-specific release notes.

Simulink Verification and Validation 2.5

- New formatting template for authoring Model Advisor checks
- Enhanced documentation and guidelines for customizing the Model Advisor
- Incorporation of MathWorks Automotive Advisory Board (MAAB) guidelines into product documentation
- Ability to include or exclude external M-files to optimize the coverage analysis of Embedded MATLAB Function blocks

For details, see the product-specific release notes.

Stateflow 7.3

- Ability to save, restore, and restart the complete simulation state using the SimState feature
- Support for modifying active states, chart local data, chart output data, and persistent data in Embedded MATLAB functions
- Support for enumerated data types in Embedded MATLAB functions and Truth Table blocks
- New keywords `true` and `false` in action language
- New diagnostic to detect unintended backtracking behavior in flow graphs

For details, see the product-specific release notes.

Stateflow Coder 7.3

- Enhanced control over inlining of state functions in generated code

For details, see the product-specific release notes.

Statistics Toolbox 7.1

- New Naïve Bayes classifier for data sets that contain many predictors or features, with support for normal, kernel, multinomial, and multivariate multinomial distributions
- Ensemble methods for bagging classification and regression trees, including Breiman's random feature selection method
- Receiver Operating Characteristic (ROC) and other performance curves for evaluating classifiers
- New probability distribution object that provides a consistent interface for working with probability distributions
- Enhanced dataset array, including inner and outer joins and the ability to export a dataset array to an Excel[®] file

For details, see the product-specific release notes.

Symbolic Math Toolbox 5.2

- New `emlBlock` method generates Simulink blocks from `sym` objects
- Ability to generate MATLAB code from MuPAD® expressions
- New option to simplify results from core MuPAD functions by using common algebraic assumptions
- Enhanced readability of typeset MuPAD expressions
- Enhanced solvers for ordinary differential equations, improving performance and handling of more equation types

For details, see the product-specific release notes.

SystemTest 2.3

- New MAT-file test vector that reads data from individual MAT-files into the SystemTest™ environment
- Automatic naming of test vectors and test variables useful for testing Simulink models with large numbers of inports or outports
- Enhanced inport support in Simulink element for logged signals, including time series and bus signals
- Ability to edit test vectors from within individual test elements

For details, see the product-specific release notes.

Target Support Package FM5 (for Freescale MPC5xx) 2.2.3

- New host-side CAN blocks (requires Vehicle Network Toolbox)
- New CAN message packing and unpacking blocks

For details, see the product-specific release notes.

Target Support Package IC1 (for Infineon C166) 1.5.3

- New host-side CAN blocks (requires Vehicle Network Toolbox)
- New CAN message packing and unpacking blocks

For details, see the product-specific release notes.

Target Support Package TC2 (for TI C2000 DSP) 3.2

- Direct Memory Access (DMA) support for C28x3x
- DMA option added to the C28x3x ADC block
- New DC/DC Buck Converter demo
- Enhanced Motor Control Workflow demo with new External Mode

For details, see the product-specific release notes.

Target Support Package TC6 (for TI C6000 DSP) 3.6

- Support for Avnet S3ADSP DaVinci Evaluation platform
- New Audio Workflow demo
- New DM643x UART blocks
- Enhanced DM643x Video Display block with new component video output option

For details, see the product-specific release notes.

Video and Image Processing Blockset 2.7

- Enhanced Video Viewer block with playback and visualization controls
- Enhanced Draw Shapes and Draw Markers blocks to accept fill and border color values at the input port
- Enhanced code generation that eliminates the need for additional libraries by including minimal required functions in the build directory

- Support for convergent, round, and simplest rounding method in fixed-point blocks
- Memory use improvements in 2-D FIR, 2-D Convolution, and 2-D Correlation blocks

For details, see the product-specific release notes.

Wavelet Toolbox 4.4

- New demo on adding user-designed wavelets
- New demo on using wavelet scalograms to obtain spectral information
- New demo on wavelet denoising using interval-dependent thresholds

For details, see the product-specific release notes.

xPC Target 4.1

- Support for pulse generation, pulse width measurement, and incremental encoders for National Instruments data acquisition boards: PCI-6221, PCI-6229, PCI-6251, PCI-6259, PCI-6280, PCI-6281, and PCI-6289
- Enhanced J1939 library that supports transport protocol
- Support for the GE Fanuc PCI-5565PIORC shared/reflective memory board
- Support for SSE2 (Intel Streaming SIMD Extensions 2) for enhanced floating-point performance

For details, see the product-specific release notes.

New Products

R2009a contains two new products.

In this section...	
“Simulink® Design Optimization” on page 1-31	
“Vehicle Network Toolbox” on page 1-32	
Simulink Design Optimization	Estimate and optimize Simulink model parameters
Vehicle Network Toolbox	Communicate with in-vehicle networks using CAN protocol

Note As of R2009a, Simulink Parameter Estimation and Simulink Response Optimization functionality are merged into a new product, Simulink Design Optimization. Simulink Parameter Estimation and Simulink Response Optimization are no longer available.

Simulink Design Optimization

Simulink Design Optimization lets you improve designs by estimating and tuning model parameters using numerical optimization. You can increase model accuracy by using test data to calibrate physical parameters, such as mass or resistance. You can then improve system performance, reduce system cost, and meet other objectives by automatically tuning design parameters in your Simulink model. For example, you can optimize controller gains to meet rise time and overshoot constraints, or jointly optimize physical and algorithmic parameters to maximize overall system performance.

Key Features

- Estimation of physical parameters from test data
- Preprocessing of test data, including data selection, offset removal, detrending, noise filtering, and missing data reconstruction
- Optimization of time-domain responses of nonlinear Simulink models

- Optimization of time- and frequency-domain responses of linear control systems (with Control System Toolbox™)
- Ability to graphically specify response requirements, and then visually monitor the optimization progress
- Ability to factor in parameter variation or uncertainty for robust design optimization

For details, see the product-specific release notes.

Vehicle Network Toolbox

Vehicle Network Toolbox lets you send and receive CAN packets directly from MATLAB or Simulink. It enables encoding, decoding, and filtering of CAN messages, and lets you work with industry standard CAN database files.

With Vehicle Network Toolbox, you can create test and analysis applications in MATLAB that use live data from CAN networks. You also can use live CAN data to validate Simulink models. Vehicle Network Toolbox lets you communicate with the CAN bus directly from MATLAB or Simulink so that you can correlate and synchronize CAN messages with other data and monitor CAN bus traffic. The toolbox provides full support for the following Vector CAN interface hardware: CANCardX, CANcardXL, CANcaseXL, CANboardXL, CANboardXL PCIe, and CANboardXL pxi.

Key Features

- MATLAB functions for transmitting and receiving CAN packets
- CAN communication blocks for connecting a CAN bus to a Simulink model
- Support for Vector interface hardware and Vector CAN database (.dbc) files
- Ability to filter and log CAN messages
- Bit packing and unpacking functions and blocks for simplified encoding and decoding of CAN messages
- Message traffic GUI for visualizing live CAN network traffic

For details, see the product-specific release notes.

R2009a Products with License-Related Changes

Several products have license-related changes in R2009a. To use the latest version of each product, you must have a subscription to MathWorks Software Maintenance Service (SMS) as of R2009a.

In this section...

“Simulink® Parameter Estimation and Simulink® Response Optimization” on page 1-33

“Target Support Package FM5 (for Freescale MPC5xx)” on page 1-33

“Target Support Package IC1 (for Infineon C166)” on page 1-34

“Target Support Package TC2 (for TI C2000 DSP)” on page 1-34

“Virtual Reality Toolbox” on page 1-34

Note Beginning with R2009a, new release DVDs no longer ship automatically with your MathWorks Software Maintenance Service subscription. You have two options to access product updates:

- Download from the MathWorks Web site
 - Submit a DVD shipment request using the License Center
-

Simulink Parameter Estimation and Simulink Response Optimization

As of R2009a, Simulink Parameter Estimation and Simulink Response Optimization functionality are merged into a new product, Simulink Design Optimization. Simulink Parameter Estimation and Simulink Response Optimization are no longer available.

Target Support Package FM5 (for Freescale MPC5xx)

As of R2009a, Simulink host-side CAN Driver and CAN Message blocks from Target Support Package™ FM5 move into Vehicle Network Toolbox, a new product for communicating with in-vehicle networks using CAN protocol.

Target Support Package IC1 (for Infineon C166)

As of R2009a, Simulink host-side CAN Driver and CAN Message blocks from Target Support Package IC1 move into Vehicle Network Toolbox, a new product for communicating with in-vehicle networks using CAN protocol.

Target Support Package TC2 (for TI C2000 DSP)

As of R2009a, Simulink host-side CAN Driver and CAN Message blocks from Target Support Package TC2 move into Vehicle Network Toolbox, a new product for communicating with in-vehicle networks using CAN protocol.

Virtual Reality Toolbox

As of R2009a, Virtual Reality Toolbox™ is renamed Simulink 3D Animation.

Compatibility Considerations

These topics summarize potential compatibility considerations when upgrading from R2008b to R2009a.

In this section...
“R2009a Compatibility” on page 1-35
“Compatibility for Each Product” on page 1-39
“Compatibility Considerations for New Functions and Models” on page 1-39

R2009a Compatibility

This table highlights some important potential compatibility issues when upgrading from R2008b to R2009a. Refer to product-specific release notes for details on these and other product-specific compatibility considerations.

Compatibility issues that are reported after the product has been released are added to Bug Reports at the MathWorks Web site. Because bug fixes can sometimes result in incompatibilities, also review fixed bugs in Bug Reports for any compatibility impact.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB Desktop Tools	The Help browser no longer reopens at startup. In previous versions, it opened automatically if it was open when you last exited MATLAB.	The Help browser will not be open when you start MATLAB.	To manually open the Help browser after starting MATLAB, run <code>helpbrowser</code> . To automatically open the Help browser upon startup, use a startup option—for example, include <code>helpbrowser</code> in a <code>startup.m</code> file.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB Desktop Tools	On UNIX [®] platforms (except the Apple [®] Macintosh [®] platform), MATLAB now uses Mozilla [®] Firefox [®] as the default system browser, and no longer uses <code>docopt.m</code> to determine the system browser.	If you do not have Firefox on your system and MATLAB tries to access a system browser, such as with the <code>web</code> function, or if you have code that relies on <code>docopt.m</code> , MATLAB produces warnings.	If you want a different browser to be the default, you need to explicitly specify it using Web preferences. If you relied on <code>docopt.m</code> in your code, you need to change your code. For more information, see “New System Browser Preference Instead of <code>docopt.m</code> for MATLAB on UNIX Platforms”.
MATLAB Programming Fundamentals	The format in which MATLAB saves Timer objects has changed in MATLAB Version 7.8.	You cannot load any Timer objects you create and save in MATLAB 7.8 into an earlier version of MATLAB.	Reconstruct a new Timer object at run time in your current session, instead of loading it from a MAT-file.
MATLAB External Interfaces	You can no longer build MEX-files using the MATLAB Version 5 API.	This error message displays: The “-V5” option is no longer supported.	You must replace functions shown in the Obsolete Functions: MX Array Manipulation table with functions from the Replacement column, if available.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB External Interfaces	Variables in MEX-files that call the BLAS or LAPACK math packages on 64-bit platforms now must be of type <code>mwSignedIndex</code> .	If you run a MEX-file compiled in an earlier version of MATLAB with variables initialized to a different data type, MATLAB could crash. Source FORTRAN or C code on 64-bit platforms in which variables are not initialized as type <code>mwSignedIndex</code> will fail to compile.	Recompile any MEX-files that call the BLAS or LAPACK math packages on 64-bit platforms. Initialize all 64-bit variables in the source FORTRAN or C code as type <code>mwSignedIndex</code> .
Simulink	If you compile or simulate a model that contains a Level-1 Fortran S-function, an error displays.	An error message that the <code>mxcreatefull</code> function, within the Fortran S-function wrapper (<code>simulink.F</code>), has been removed displays.	If the S-function does not explicitly use <code>mxcreatefull</code> , recompile the S-function. If the S-function uses <code>mxcreatefull</code> , replace each instance with <code>mxcreatedoublematrix</code> and recompile the S-function.
Simulink	You can specify only one signal object for a signal. Previously, you could specify multiple signal objects for the same signal if all the objects had the same identifier and at most one signal object had non-Auto storage class.	A model that specifies more than one signal object on the same signal produces an error when you compile the model.	Change the model so that a given signal has at most one associated signal object. If the object has an alias, both the primary name and the alias name can appear on the signal, because both names refer to the same object.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
Image Processing Toolbox™	The Overview tool no longer opens automatically when launching the Image Tool (imtool).	In previous releases, the Overview tool opened automatically when launching the Image Tool (imtool).	To have the Overview tool open automatically with the Image Tool, change preferences using the new Image Processing Preferences dialog box or the iptsetpref command.
Image Processing Toolbox	Image Processing preferences now persist from one MATLAB session to the next.	In previous releases, preferences reverted to the default settings each time a MATLAB session closed.	To return to the default preference settings, change preferences using the new Image Processing Preferences dialog box or the iptsetpref command.
Symbolic Math Toolbox	The dsolve command now accepts the IgnoreAnalytic Constraints option, which controls the level of mathematical rigor used on the analytical constraints on the solution. By default, the solver ignores all analytical constraints.	The dsolve command could produce different results than in previous releases.	To obtain the same solutions as in the previous release, set the value of the IgnoreAnalytic Constraints option to 'none'.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
Signal Processing Toolbox™ and Filter Design Toolbox	A number of FIR equiripple filter designs now use a new default algorithm. For a detailed list of the affected FIR equiripple filter designs, see the release notes for “Version 4.5 (R2009a) Filter Design Toolbox”.	Code used to design FIR equiripple filters in R2009a could generate a filter with different coefficients or a different order, and could produce different results than these filters in previous releases.	To recreate the previous FIR equiripple filter design, set the new <code>UniformGrid</code> property in the filter design to <code>false</code> .

Compatibility for Each Product

To see if any reported compatibility considerations exist for your product, see “Release Summary” on page 1-41. If the table shows that there are reported compatibility considerations for any of your products, follow the link to the product’s release notes and refer to the summary table of compatibility considerations. From this table you can link to details. If you are upgrading from a release before R2008b, also see the entries in the table for earlier versions.

Compatibility Considerations for New Functions and Models

The introduction of new functions and models could cause a conflict with any of your own M-files, models, and variables having the same names. To identify and address name conflicts, see these topics in the MATLAB Programming Fundamentals documentation:

- Don’t Use Function Names for Variables
- Naming a Function Uniquely

System Requirements

The major system requirements changes for R2009a follow.

In this section...
“Platforms No Longer Available for New Releases” on page 1-40
“Changes to zlib Library” on page 1-40

Platforms No Longer Available for New Releases

As of R2009a, new releases from The MathWorks are no longer available on:

- Apple Mac OS® X 10.4 Intel® processors

Changes to zlib Library

As of R2009a, the following changes have been made to the distribution of the `zlib` library:

- Microsoft Windows 32-bit platform — The MathWorks ships the industry standard prebuilt version.
- Macintosh and Linux platforms — The MathWorks products use the native `zlib` installed on the system.

No change has been made on the following platforms for which The MathWorks continues to build and ship `zlib` Version 1.2.3:

- Windows 64-bit platform
- Sun™ Solaris™ platform

For more information on system requirements, visit [Platforms & Requirements](#).

Release Summary

An asterisk (*) after a product name indicates the product has had a Web release since R2008b.

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
MATLAB	Yes	Yes	Yes
Simulink	Yes	Yes	Yes
Aerospace Blockset™	Yes	No	No
Aerospace Toolbox	Yes	No	No
Bioinformatics Toolbox™	Yes	Yes	Yes
Communications Blockset™	Yes	Yes	Yes
Communications Toolbox™	Yes	Yes	Yes
Control System Toolbox	Yes	Yes	Yes
Curve Fitting Toolbox	Yes	Yes	No
Data Acquisition Toolbox™	Yes	Yes	No
Database Toolbox™	No	No	No
Datafeed Toolbox™	Yes	Yes	No
Econometrics Toolbox™	Yes	No	Yes
EDA Simulator Link™ DS	No	Yes	No
EDA Simulator Link™ IN	Yes	Yes	No
EDA Simulator Link™ MQ	Yes	Yes	Yes
Embedded IDE Link™ CC	Yes	Yes	Yes
Embedded IDE Link™ MU	Yes	No	Yes
Embedded IDE Link TS	Yes	No	Yes
Embedded IDE Link VS	Yes	Yes	Yes
Filter Design HDL Coder™	Yes	No	Yes

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Filter Design Toolbox	Yes	Yes	Yes
Financial Derivatives Toolbox™	Yes	No	No
Financial Toolbox™	Yes	Yes	No
Fixed-Income Toolbox™	Yes	Yes	No
Fixed-Point Toolbox	Yes	Yes	Yes
Fuzzy Logic Toolbox™	No	No	No
Gauges Blockset™	No	No	No
Genetic Algorithm and Direct Search Toolbox™	No	No	No
Image Acquisition Toolbox™	Yes	Yes	Yes
Image Processing Toolbox	Yes	Yes	Yes
Instrument Control Toolbox™	Yes	Yes	No
Mapping Toolbox™	No	Yes	Yes
MATLAB Builder EX	Yes	Yes	No
MATLAB Builder JA	Yes	Yes	No
MATLAB Builder NE	Yes	Yes	No
MATLAB Compiler	Yes	Yes	No
MATLAB® Distributed Computing Server™	Yes	Yes	Yes
MATLAB® Report Generator™ *	Yes	Yes	No
Model-Based Calibration Toolbox™	Yes	No	No
Model Predictive Control Toolbox™	Yes	No	No
Neural Network Toolbox™	No	No	No
OPC Toolbox™	No	No	No
Optimization Toolbox™	Yes	Yes	Yes
Parallel Computing Toolbox	Yes	Yes	Yes

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Partial Differential Equation Toolbox™ (no release notes)	No	No	No
PolySpace® Client™ for C/C++	Yes	Yes	Yes
PolySpace® Server™ for C/C++	Yes	Yes	Yes
PolySpace Client for Ada	Yes	No	No
PolySpace Server for Ada	Yes	Yes	No
PolySpace Model Link™ SL	Yes	Yes	No
PolySpace Model Link TL	Yes	Yes	No
PolySpace UML Link RH	Yes	No	No
Real-Time Windows Target™	Yes	Yes	No
Real-Time Workshop	Yes	Yes	Yes
Real-Time Workshop Embedded Coder	Yes	Yes	Yes
RF Blockset™	Yes	Yes	Yes
RF Toolbox™	Yes	Yes	No
Robust Control Toolbox™	No	Yes	No
Signal Processing Blockset™	Yes	Yes	Yes
Signal Processing Toolbox	Yes	Yes	No
SimBiology	Yes	No	No
SimDriveline™	No	No	No
SimElectronics™	Yes	No	No
SimEvents®	Yes	Yes	Yes
SimHydraulics®	Yes	No	No
SimMechanics	Yes	Yes	No
SimPowerSystems™	Yes	Yes	Yes
Simscape	Yes	Yes	Yes

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Simulink® Control Design™	Yes	Yes	No
Simulink Design Optimization	Yes	No	No
Simulink® Design Verifier™	Yes	Yes	No
Simulink Fixed Point	Yes	Yes	Yes
Simulink® HDL Coder™	Yes	No	Yes
Simulink Parameter Estimation (transitioned to Simulink Design Optimization)	Yes	No	No
Simulink® Report Generator™ *	Yes	Yes	No
Simulink Response Optimization (transitioned to Simulink Design Optimization)	Yes	No	No
Spreadsheet Link™ EX	No	No	No
Simulink® Verification and Validation™	Yes	Yes	No
Spline Toolbox™	No	No	No
Stateflow and Stateflow® Coder™	Yes	Yes	Yes
Statistics Toolbox™	Yes	Yes	Yes
Symbolic Math Toolbox	Yes	Yes	Yes
System Identification Toolbox™	Yes	Yes	No
SystemTest	Yes	Yes	Yes
Target Support Package FM5	Yes	Yes	Yes
Target Support Package IC1	Yes	No	Yes
Target Support Package™ TC2	Yes	Yes	Yes
Target Support Package TC6	Yes	Yes	Yes
Vehicle Network Toolbox	Yes	No	No
Video and Image Processing Blockset™	Yes	Yes	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Virtual Reality Toolbox (renamed Simulink 3D Animation)	Yes	No	No
Wavelet Toolbox™	Yes	Yes	No
xPC Target™	Yes	Yes	Yes