SimDriveline™ Release Notes

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508-647-7000 (Phone)

508-647-7001 (Fax)

The MathWorks, Inc.
3 Apple Hill Drive
Natick, MA 01760-2098

For contact information about worldwide offices, see the MathWorks Web site.

SimDriveline™ Release Notes

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Summary by Version

This table provides quick access to what's new in each version. For clarification, see "Using Release Notes" on page 1.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Latest Version V2.0 (R2011a)	Yes Details	Yes	Bug Reports at Web site

Using Release Notes

Use release notes when upgrading to a newer version to learn about:

- New features

- Changes

- Potential impact on your existing files and practices

Review the release notes for other MathWorks® products required for this product (for example, MATLAB® or Simulink®). Determine if enhancements, bugs, or compatibility considerations in other products impact you.

If you are upgrading from a software version other than the most recent one, review the current release notes and all interim versions. For example, when you upgrade from V1.0 to V1.2, review the release notes for V1.1 and V1.2.

What Is in the Release Notes

New Features and Changes

- New functionality

- Changes to existing functionality

Version Compatibility Considerations

When a new feature or change introduces a reported incompatibility between versions, the **Compatibility Considerations** subsection explains the impact.

Compatibility issues reported after the product release appear under Bug Reports at the MathWorks Web site. Bug fixes can sometimes result in incompatibilities, so review the fixed bugs in Bug Reports for any compatibility impact.

Fixed Bugs and Known Problems

MathWorks offers a user-searchable Bug Reports database so you can view Bug Reports. The development team updates this database at release time and as more information becomes available. Bug Reports include provisions for any known workarounds or file replacements. Information is available for bugs existing in or fixed in Release 14SP2 or later. Information is not available for all bugs in earlier releases.

Access Bug Reports using your MathWorks Account.

Documentation on the MathWorks Web Site

Related documentation is available on `mathworks.com` for the latest release and for previous releases:

- Latest product documentation
- Archived documentation

Version 2.0 (R2011a) SimDriveline Software

This table summarizes what's new in Version 2.0 (R2011a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes	Yes—See "Working with Version 1 Models and Libraries" on page 6, below. See also Summary	Bug Reports at Web site

New features and changes introduced in this version are organized by these topics:

- "SimDriveline 2.0 Software" on page 3

- "Selected Version 2.0 Features Compared with Version 1 Features" on page 5

- "Working with Version 1 Models and Libraries" on page 6

- "Accessing Version 1" on page 7

SimDriveline 2.0 Software

SimDriveline™ 2.0 is a new version of an existing product in the Physical Modeling family that models and simulates drivetrain systems. The new version is fully integrated with Simscape™ software and supports physical connections, physical signals, data logging, local solvers, and other Simscape features. At the same time, this new version extends the Simscape library with additional rotational and translational mechanical components.

With SimDriveline software, you can model bodies rotating around and translating along multiple axes, connect them with gears, and create powertrains with clutches, transmissions, and other dynamic elements and subsystems. SimDriveline software also lets you actuate and measure torques, forces, and motion. You can model, simulate, analyze, and control the motion of complex drivetrains.

SimDriveline 2.0 also includes:

- Components that couple rotational and translational motion.
- Gears with optional friction loss.
- Clutches using Coulomb friction that lock and unlock.
- Improved algorithms for simulation of redundant dynamic constraints.
- A translator function to convert Version 1 models and user-defined libraries to be compatible with the new Version 2 product library.

Required Products

SimDriveline software is an extension of the Simscape product and requires these products:

- MATLAB
- Simulink
- Simscape

Selected Version 2 Capabilities Based on Simscape Software

For an introduction to Simscape blocks, modeling, and simulation, consult the *Simscape Getting Started Guide*.

For learn more about the Simscape features that improve how you model and simulate driveline systems, see these sections of the *Simscape User's Guide*:

- "Basic Principles of Modeling Physical Networks".
- "Logging Simulation Data".
- "Setting Up Solvers for Physical Models" and "Customizing Solvers for Physical Models".

To learn how to define Simscape based blocks programmatically, see the *Simscape Language Guide*.

For details on Simscape mechanical and utility blocks that replace certain Version 1 blocks, see the block categories in the *Simscape Reference*.

Selected Version 2.0 Features Compared with Version 1 Features

Features Improved in Version 2.0

- Efficiency and other frictional losses in Version 2 gears.

  These loss features are now built into the gear blocks. MathWorks recommends that you select adaptive zero-crossing in the Configuration Parameters menu of models that include gears with efficiency loss.

- Data logging without sensors.

  Version 2 supports the Simscape data logging capability.

- Simscape fixed-step local solver now supported.

  You can use a separate local, fixed-step solver on physical networks in Version 2 models.

- Redundant dynamic constraints now solved without errors.

  In Version 2 models, when ideal clutches lock and carry the same load, the load is now distributed between the clutches without generating simulation errors.

Features Changed in Version 2.0

- Certain mechanical rotational components in the Version 1 library now provided by the Simscape Foundation library, in its mechanical and utilities sublibraries.

  These equivalent components include Solver Configuration, Inertia, various sensors and sources, and simple rotational mechanisms.

- Direct connection to other Simscape components.

  You can directly connect Version 2 blocks to other components based on Simscape software, without an interface component, as long as you respect the Simscape rules concerning physical ports and connections. SimDriveline driveline ports and connection lines are now mechanical conserving rotational or translational ports and physical connection lines.

- Motion initial conditions set in Version 2 Inertia and Mass blocks.

In Version 1, you set initial conditions in a separate block.

- Simulink variable-step solvers for variable-step simulation.

  Version 2 is compatible with all Simulink solvers. For variable-step simulation, MathWorks recommends that you select `ode23t` or `ode15s` in your model Configuration Parameters menu.

Other Changes in Version 2.0

- Version 2 generated code simulation is slower than with Version 1.

- Tunable parameters are not supported with the SimDriveline 2 libraries.

  Changing block parameter values for simulating with generated code requires changing those parameter values in the block dialog boxes and regenerating the code from the model. A workaround is:

  1 Create your own versions of the blocks using the Simscape language.

  2 Make the parameters that you want to tune into signal inputs by defining the input values as Simulink Constant blocks.

  3 Convert these Simulink constant signals into physical signals with Simulink-PS Converter blocks.

  4 Tune the Constant block values during the simulation.

Working with Version 1 Models and Libraries

Compatibility Considerations

Block diagrams built from Version 1 and block diagrams built from Version 2 can coexist in the same model or library. You can indirectly connect Version 1 block diagrams and Version 2 block diagrams using Version 1 Rotational Coupling interface blocks. You cannot connect them directly.

You can continue to create and use Version 1 models and libraries, separately from Version 2 models and libraries.

Converting Models and Libraries from Version 1 to Version 2

Optionally, you can convert models and user-defined libraries from Version 1 to Version 2 with a model conversion utility, accessed through the `sdl_update`

function. This utility creates new models and user-defined libraries with
Version 1 components replaced by new versions using a transitional library
that is based on the SimDriveline 2 and Simscape libraries.

For more information on conversion, see the `sdl_update` function reference
page and "Relationship of Version 1 and Version 2".

Accessing Version 1

The Version 1 library and documentation are included with Version 2.

Accessing the Version 1 Library

To open the Version 1 library, at the command line, enter `drivelib` or
`driveline`.

Accessing the Version 1 Demos

To view a list of the Version 1 demo models, do one of the following:

- In the Help browser, on the Version 1 SimDriveline product roadmap page,
  click the product demos link.

- At the command line, enter `help drivedemos`.

If you use the command line, the demos list appears at the command line. If
you click a linked individual demo model name, information about that model
appears at the command line.

Accessing the Version 1 Documentation

To access the Version 1 documentation, access the online version of the
Version 2 release notes through the Help browser or at the MathWorks Web
site, `www.mathworks.com`.

Compatibility Summary for SimDriveline Software

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided in the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V2.0 (R2011a)	See the **Compatibility Considerations** subheading for Version 1: • "Working with Version 1 Models and Libraries" on page 6 • "Accessing Version 1" on page 7