

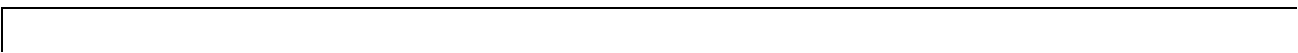
SimMechanics Release Notes

These Release Notes introduce the new SimMechanics product. They include the following sections:

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- “Major Bug Fixes” on page 1-3
- “Upgrading from an Earlier Release” on page 1-5
- “Known Software and Documentation Limitations” on page 1-7

Printing the Release Notes

If you would like to print the Release Notes, you can link to a PDF version.



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Introduction to SimMechanics

Note SimMechanics 1.1 is the first release of this product as part of a MathWorks release CD. SimMechanics 1.0 was initially released in Web-downloadable form after Release 12.1 was released, but before Release 13. These Release Notes describe any changes introduced after Version 1.0.

With SimMechanics, you can directly model multibody machines and their components – such as bodies, joints, constraints, actuators, and sensors – then simulate their motions and analyze the results without having to derive the equations governing the system’s motion.

SimMechanics also offers an efficient and intuitive tool for combining mechanical system models with their corresponding control system models, all within the Simulink environment.

Major Bug Fixes

SimMechanics 1.1 includes many bug fixes made since Version 1.0. This section describes the particularly important Version 1.1 bug fixes.

Subsystem Body Coordinate System Ports

For large subsystems, Body coordinate system (CS) ports on subsystem boundaries now correctly match the original Body CSs in the subsystem Bodies themselves. In Version 1.0, Body CS ports on the subsystem boundary were not always correctly matched to the original Body CSs from which the subsystem ports came.

Masked Subsystems

Masked subsystems containing SimMechanics blocks no longer produce errors during simulation.

Configurable Subsystems

Configurable subsystems now work with SimMechanics blocks, with some limitations. See “Configurable Subsystems Limitation” on page 1-7.

Supported Nonvirtual Subsystems

SimMechanics 1.1 now supports Atomic, Enabled, If, and Switch Case subsystems, provided that the subsystem encapsulates an entire SimMechanics machine. See also “Unsupported Nonvirtual Subsystems” on page 1-7.

Corrected English Unit for Body Inertia

The incorrect English moment of inertia unit $\text{lb}\cdot\text{ft}/\text{s}^2$ has been changed to $\text{slug}\cdot\text{ft}^2$. The old, incorrect unit is physically equivalent to the new, correct unit. See “Correcting English Units for Body Inertia” on page 1-5.

Automatically Cut Joints Now Marked

In the **Constraints** pane of the **Mechanical Environment Settings** dialog box, the **Mark automatically cut joints** feature is now implemented.

Body Sensor Output Signals Reordered

The output ports, or if the signals are bundled, the output vector signal components, of the Body Sensor are now ordered in the same sequence as the output signal order in the dialog box. The old dialog order was incorrect. See “Reordering Body Sensor Output Signals” on page 1-5.

No Actuating or Sensing Massless Connectors

Sensor and Actuator ports can no longer be added to Massless Connector Joint blocks. See “Removing Invalid Sensor and Actuator Connections” on page 1-6.

New Utilities Block for Joint Sensor Angular Output

The Joint Sensor block outputs discontinuous angles for rotational motion, bounded in the interval $(-\pi, +\pi]$ radians. There is a new block, Continuous Angle, for converting discontinuous angular output to continuous, unbounded angular output, located in the SimMechanics Utilities library.

Simulink Tools Now Supported with SimMechanics

Accelerator Mode and the Model Differences tool now function with SimMechanics blocks. The Accelerator recompiles the executable code during every simulation when Accelerator Mode is selected.

Visualizing Multiple Machines

SimMechanics now renders and animates multiple independent machines in the same model.

Upgrading from an Earlier Release

This section describes the upgrade issues involved in moving from SimMechanics Version 1.0 to Version 1.1.

Referencing Body Coordinate System Names

Body coordinate system (CS) name references have been restricted and simplified in SimMechanics 1.1.

In a given Body block, you can now make body and grounded CS references in three ways. References from one Body CS to other CS names must be to:

- World
- Other Body CSs on the same body
- The *Adjoining CS*, the coordinate system on a neighboring Body or Ground directly connected to the selected Body CS by a Joint, Constraint, or Driver.

The Modeling Bodies section and the Body block reference page explain this CS name reference scheme.

Correcting English Units for Body Inertia

To change old models using the incorrect English inertia unit $\text{lb}\cdot\text{ft}/\text{s}^2$ to the new English inertia unit $\text{slug}\cdot\text{ft}^2$:

- 1 Open each Body dialog with the incorrect unit and click **OK** or **Apply**.
- 2 Once you have completed all such Body dialogs, resave the model to preserve the update.

Reordering Body Sensor Output Signals

When you open and save old models using Body Sensors, SimMechanics 1.1 automatically implements the new Body Sensor dialog (see “Body Sensor Output Signals Reordered” on page 1-4 previously). You might need to reorder the output signal lines to reflect the correct signal sequence, however.

Removing Invalid Sensor and Actuator Connections

When you run an existing model containing Massless Connectors with connections to Actuator and Sensor blocks, SimMechanics 1.1 issues an error asking you to replace each old Massless Connector with a new Massless Connector from the block library. You cannot connect Sensor and Actuator blocks to the new Massless Connectors.

Utilities Block Name Change

The SimMechanics 1.0 Utilities library contained the Pose2VR block, for converting 3-by-3 orthogonal rotation matrices to equivalent axis-angle rotations. In version 1.1, this block has been renamed RotationMatrix2VR. Old Pose2VR blocks are converted automatically to RotationMatrix2VR blocks when an old model is loaded.

Reconfiguring Virtual Reality Visualization

The SimMechanics documentation assumes that you are using the new default Virtual Reality Toolbox viewer. You are free to install and use the blaxxun Contact 4.4 plug-in viewer with a Web browser.

Installing the Browser Plugin Viewer

Important tips for installing the blaxxun Contact browser plugin viewer:

- Use Version 4.4 of the Contact viewer that ships with the Virtual Reality Toolbox and which is available for Web download from the MathWorks. Do not upgrade to a later version of the blaxxun Contact plugin.
- Before installing the blaxxun Contact plugin, turn off the MATLAB Web server. This allows the blaxxun viewer to register itself over the Web and finish installation. You can turn the MATLAB Web server back on after installing.
- The Microsoft Internet Explorer browser, Version 5.5 or higher, requires manual reconfiguration for use with the blaxxun viewer. You must reset the Java-related network security settings, as explained in the Virtual Reality Toolbox User's Guide.

Known Software and Documentation Limitations

This section describes known software and documentation problems in Version 1.1.

Platform Limitations

The SimMechanics virtual reality visualization has some platform limitations, as described below.

Virtual Reality Toolbox Viewers

- The default viewer functions on UNIX/Linux platforms, but only with virtual reality code written in the VRML 2 standard.
- The blaxxun Contact plugin viewer works only on Windows platforms. It can read virtual reality code in both VRML 1 and VRML 2 formats.

Saving SimMechanics Models

You cannot save a SimMechanics model while the model is paused. If you want to save it, stop the model simulation first.

Changing Block Properties

You cannot change SimMechanics block properties at the command line.

Configurable Subsystems Limitation

Simulink configurable subsystems work with SimMechanics blocks as long as all of the block choices have consistent port signatures.

Unsupported Nonvirtual Subsystems

For Iterator, Function-Call, Triggered, and While Iterator subsystems cannot contain SimMechanics blocks.

Currently Unsupported Simulink Features and Tools

Certain Simulink features and tools are currently not functioning with SimMechanics blocks or SimMechanics models.

Adjoining Coordinate Systems After Undeleting a Body

If you delete a Body, then undo the delete, and this Body references Adjoining coordinate systems (CSs) on neighboring Bodies, the restored Body's CS references that were to Adjoining CSs are reset to the World CS. Fix this bug by immediately updating the diagram after the undelete. Select **Update diagram** from the model **Edit** menu, or enter **Ctrl-D** at the keyboard.

Inactive Body Actuator Causes MATLAB to Crash

You can apply a force and/or torque to a body with a Body Actuator by selecting the appropriate dialog check boxes. If you clear both check boxes, however, MATLAB crashes when you begin the simulation. Either apply an actuation signal or eliminate the inactive Body Actuator from your model.

Virtual Reality Visualization

The presentations of virtual reality visualization in the SimMechanics User's Guide assume that you are using the new default viewer. Consult the Virtual Reality Toolbox documentation for instructions on using the optional blaxxun Contact 4.4 plugin viewer for Web browsers. You must use the plugin viewer if you want to view virtual reality scenes written in the VRML 1 format.

Rendering and Animation Bugs

These are sporadic minor problems with the blaxxun plugin viewer:

- If the machine is not initially visible in the browser, try closing the browser and restarting, or try the browser's **Refresh** or **Reload** buttons.
- When you update a diagram, the virtual reality scene might not update as it should. Click the browser's **Refresh** or **Reload** buttons to update the scene manually.

Internet Explorer Bugs

Microsoft Internet Explorer sometimes malfunctions while viewing a virtual scene through the blaxxun plugin viewer.

- You sometimes see a nonfatal console error dialog while viewing a virtual scene. Click on **OK** in this dialog if you see this error.

- Microsoft Internet Explorer 6 sometimes fails if you use it as the default browser for virtual reality. Restart the visualization from the **Mechanical Environment Settings** dialog if this happens.

