



# MapleSim™ 5

High-Performance Physical Modeling and Simulation

## What's New

MapleSim 5 provides many enhancements to help you manage the complexity of your models. With its broader application scope, streamlined modeling environment, and ability to efficiently simulate even more systems, MapleSim 5 makes it easier to tackle large projects and get results quickly.



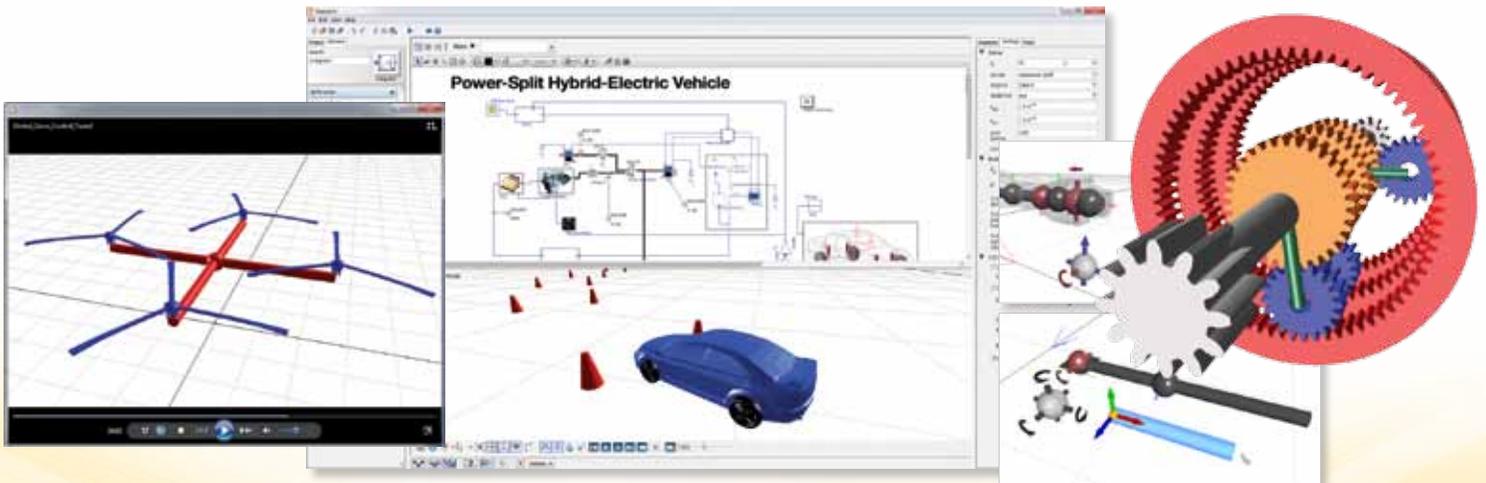
### Broader Application Scope

Over 150 new components in MapleSim 5 further expand the modeling capabilities of MapleSim, so you can use it to easily model an even wider range of systems.

- **New Magnetic Library.** New components can be used to model electromagnetic solenoids, saturating transformers, motors, and other devices. Electromagnetic devices are used in a wide variety of applications, such as fuel injection systems, dialysis machines, power transmission, washing machines, and gear boxes.
- **New Thermal Fluids Library.** With the addition of thermal fluids components, you can model heat loss in pipes and valves in MapleSim. This library is particularly useful for cooling applications such as when heat has to be removed from turbogenerators, motors, transformers, and other machinery in order to maintain optimum performance.
- **Additional Electrical Components.** New components include multiphase switches, analog switches and semiconductors, three-phase transformers, and digital converters.
- **Additional Mechanical Components.** The expanded collection provides 1-D translational and rotational motion and force drivers, sensors, and more.

### Faster Model Building

- **Enhanced Diagnostics.** MapleSim 5 includes enhanced diagnostics to assist you in testing, building, and troubleshooting your model. In addition to construction diagnostics, MapleSim 5 now provides early feedback related to the definition of the model itself, such as identifying inconsistent initial conditions, so that you can make corrections before running a simulation. MapleSim shows the location of the problem within the model by highlighting the affected components. In many cases, MapleSim then provides guidance to help you resolve the problem, such as telling you which variables may need to change. With these enhanced diagnostics, simulation problems are avoided or resolved quickly, reducing model development time significantly.
- **Increased Control over Parameters and Initial Conditions.** You can quickly experiment with your model by changing parameter and initial condition values directly, without having to first navigate to the subsystem or component where the parameter is defined in the model diagram. You can also temporarily override system variables, such as modifying a single instance of a shared library component or subsystem. Once you are satisfied with the results, you can choose to maintain different values or promote the new value so it is shared by all copies.



- **Easy Management of Parameter Sets.** MapleSim 5 makes it even easier to manage parameter sets, and includes an enhanced palette that lets you compare parameter sets with a click of a button.
- **Movie Export.** You can use 3-D animation simulation results in presentations and share them with colleagues who do not have MapleSim by exporting the animations to .mpeg format.
- **Enhanced Model Design Environment.** The model design environment now includes smart automatic rerouting of diagrams to simpler, cleaner forms, scalable port labels, and automatic labeling of subsystem ports. As a result, it is faster to construct the diagram, and the results are easier to interpret.
- **Enhanced 3-D Modeling Environment.** Numerous improvements to the 3-D modeling environment make it even easier to construct and explore 3-D models. MapleSim 5 lets you zoom in on a selection or the position of the cursor. You can easily select a specific component from a list of all components that share the same position in the 3-D diagram. MapleSim 5 provides keyboard shortcuts for connecting components, more customization options for the grid, including infinite grids drawn to the edge of the view, smooth transition from the end of an animation back to the model view so you maintain your sense of orientation, and better access to the 3-D toolbar when the viewing area is small.
- **Powerful Tools for Creating Custom Analysis Templates.** MapleSim provides built-in analysis templates that automatically extract system equations and other information from your model so you can immediately start your investigations. MapleSim 5 provides an application programming interface (API) to access this functionality, so that you can easily develop custom analysis templates that share this ability. These new commands allow you to easily interact with all of your models. You can extract parameters and equations, initialize models, run simulations, and much more.
- **Improved Equation Access.** MapleSim gives you access to the underlying system equations for your model. In MapleSim 5, those equations are presented in more readable form, making it even easier for you to understand, manipulate, and analyze your system using Maple's wide range of analytical tools.
- **Easy Access to Model Settings.** In MapleSim 5, you can access model settings instantly, even while viewing a subsystem. Model settings are now available from both the inspector tab and the project manager, and are organized into distinct groups and collapsible sections so you can quickly find values of interest.
- **Modelica® Import.** In MapleSim 5 improvements have been made to significantly speed up Modelica import. In addition, the Modelica import feature has been expanded, and components and models based on the magnetic and thermal fluids packages of the Modelica Standard Library can now be imported into MapleSim.

## Simulate More Systems

- **Code Generation for All MapleSim Models.** Optimized code generation is now available for all MapleSim models. With the expansion of code generation tools to also handle continuous systems with discrete events, MapleSim can now produce efficient C code for simulating any MapleSim model. Complete with a fixed-step solver, this royalty-free code can be incorporated into other software in your toolchain.
- **Enhanced Heuristics.** MapleSim automatically identifies more initial conditions for complex models.
- **Significant Efficiency Improvements for Large Systems.** Newly developed algorithms for the symbolic processing of models make this critical step significantly faster for large systems. In addition, enhancements to the memory management in MapleSim have further reduced the memory requirements for simulations. As a result of these changes, MapleSim 5 can simulate even larger systems than earlier releases.
- **Faster Simulations.** Simulation speeds have increased for several domain-specific applications, such as large hydraulic networks and clutches, brakes, and friction in drivelines.
- **Increased Access to the Power of Maple™.** Entire model simulations may now be seamlessly parameterized, compiled, and linked into Maple, allowing for ultra-fast parameter sweeps and optimization computations within Maple. You can then take advantage of Maple's grid computing tools to get your results even faster.

## MapleSim Toolboxes

New and enhanced toolboxes make it easy to combine the benefits of MapleSim with other products in your toolchain.

- **MapleSim Connector for dSPACE® Systems.** With the new MapleSim Connector for dSPACE Systems, you can streamline your development process by automatically converting your high-performance, high-fidelity MapleSim models into real-time applications running on a dSPACE platform.
- **Expanded Model Export.** The MapleSim Connector, for connectivity with Simulink®, and the MapleSim Connector for LabVIEW™ and NI VeriStand™ Software can now export all MapleSim models, including continuous systems with discrete events, so you can take advantage of the MapleSim modeling environment for even more models.
- **Latest Technology.** The MapleSim Control Design Toolbox, the MapleSim Tire Component Library, and the connector products have been updated to MapleSim 5, and so automatically take advantage of improvements in MapleSim 5 and Maple 15.