

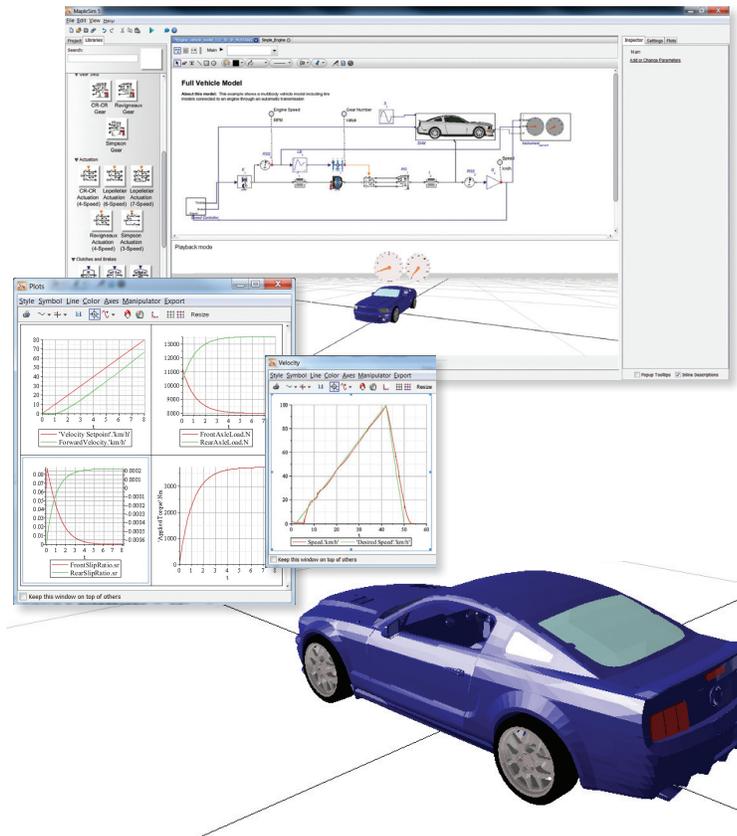


MapleSim™ Driveline Component Library

As automotive manufacturers strive to improve vehicle fuel efficiency, much of the focus is on the engine as the primary source of power loss in the vehicle powertrain. However, there is arguably as much loss through the transmission. Engineers are putting increasing effort into assessing exactly how much power is lost, and what can be done to reduce losses and improve overall efficiency. These investigations can be done using system-level modeling and real-time testing using hardware-in-the-loop (HIL) simulations.

Maplesoft has developed the MapleSim™ Driveline Component Library, a collection of components, transmission sub-assemblies, and complete powertrain examples that show the use of these components in driveline applications. Built with guidance from several transmission manufacturers, this MapleSim library allows you to mix the best of physical models and empirical data to maximize model fidelity, optimize your designs, and improve overall vehicle fuel-efficiency.

The MapleSim Driveline Component Library was designed with HIL simulation specifically in mind. For HIL simulations, it is critical that your models execute at real-time speeds. Too often, you are forced to simplify model details in order to achieve this performance. With MapleSim and the MapleSim Driveline Component Library, however, you can achieve real-time speeds for complex models where other tools would fail. MapleSim's fast simulation code allows you to develop and test your applications using high-fidelity models, so you get better results, faster.



Key Features

- Covers all aspects of the powertrain, from the engine to the differential, wheels, and road loads
- Designed specifically to allow high-fidelity models to run in real-time for HIL simulation
- Provides “lossy” versions of many components that allow losses due to tooth meshing, bearing friction, and slip to be readily incorporated using external calculations and empirical look-up tables
- Supports an acausal approach to model development, so you can simply connect components together without worrying about issues such as torque/speed directions and load flow
- Allows you to easily modify pre-built components to suit your specific requirements and increase model fidelity
- Provides building blocks so you can easily create new transmission models

Components

The MapleSim Driveline Component Library includes the following components:

- Basic Gear
- Planet Planet Gear
- Planet Ring Gear
- Planetary Gear
- Dual-ratio Planetary Gear
- Counter-rotating Planetary Gear
- CR-CR Gear
- Ravigneaux Gear
- Simpson Gear
- Simpson Actuation (3-Speed)
- CR-CR Actuation (4-Speed)
- Ravigneaux Actuation (4-Speed)
- Lepelletier Actuation (6-Speed)
- Lepelletier Actuation (7-Speed)
- Clutch
- Dog Clutch
- One Way Clutch
- Brake
- CVT
- Torque Converter
- Engine
- Dynamometer
- Loss element
- Bearing Friction
- Damper
- Differential
- Active Limited Slip Differential (ALSD)
- Longitudinal Vehicle Dynamics
- Tire
- Gear Shifter
- Ratio Selector