

# SIMPACK 8.9 – New Functionality

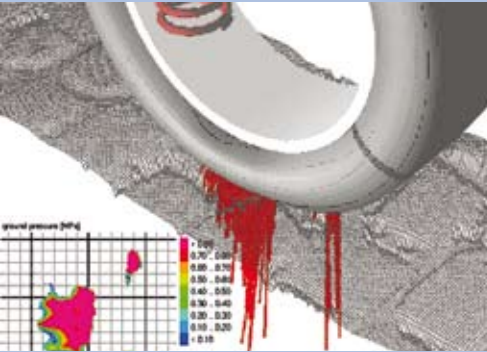


Fig. 1: FTire



Fig. 2: Silent Chain

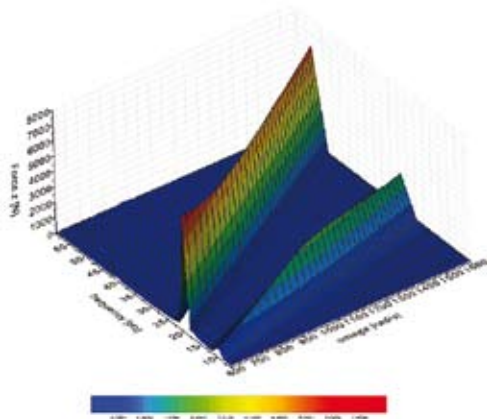


Fig. 3: 3D Plot

SIMPACK Version 8.9 comes with a rich set of new functionality as well as many improvements to existing modules. New products such as the rotor blade generator, for SIMPACK Wind, the SIMPACK Excel Plug-In and the SIMPACK Viewer are accompanied by many enhancements to existing functionality. With version 8.9 there is a significantly increased solver speed, a 3D plotting environment, flexible body stress contouring, a completely redesigned SIMPACK Rail, an new installer and a powerful new licensing environment.

## GENERAL ENHANCEMENTS

An new installer is now available with version 8.9 which significantly simplifies the installation process and user configuration. The new installer is a single self extracting executable, used for all platforms supported by SIMPACK. Installations can be performed from within a GUI or a command line, which is especially suited for rolling out SIMPACK in large installation bases. Both local and server installations are supported.

With OLicense INTEC is introducing a new and powerful licensing suite into SIMPACK. OLicense can be easily administrated via a web frontend. Because OLicense operates on the http web protocol, seamless integration into corporate networks is possible. License borrowing is now available. Via U3 USB sticks a preinstalled plug and play license server can be shipped which does not require installation. Of course traditional licensing based on classic hardware IDs in single or highly redundant server setups are possible as well.

With OLicense INTEC can now offer SIMPACK users and administrators a highly flexible, customizable and transparent licensing system.

## SOLVER NEWS

SIMPACK has always been known for outstanding solver robustness and

solver speed. With SIMPACK 8.9 INTEC has significantly increased the performance of all integrators available in SIMPACK whilst still retaining SIMPACK's renowned accuracy.

Highly optimized matrix operations, a fine tuned Jacobian evaluation scheme and specific optimizations for state-of-the-art INTEL and AMD processor architectures along with a 64 bit version of the solver, lead to performance gains of 1.5 - 3 compared to SIMPACK 8.8. The speedup was seen with models encompassing the entire SIMPACK application range. Even greater benefits can be seen for models containing a large number of states or with 64 bit solver executables. An all new SODASRT 2 integrator has now been implemented which is the successor to SIMPACK's robust and proven SODASRT. The user can now specify an output file path and split large result files.

## FLEXIBLE BODIES

SIMPACK 8.9's PostProcessor can calculate, plot and animate stress in combination with ABAQUS, ANSYS and NASTRAN. Export to the durability software FEMFAT-Max is also now part of the PostProcessor. Stress and durability calculation can be used both in combination with the scripting environment or from a command line. Memory usage could be significantly reduced for flexible bodies which do not contain geometric stiffening, thus enabling a significant increase in the number of represented modes. NASTRAN plot elements can now be visualised in SIMPACK's PostProcessor which enables a lightweight flexible body representation. The NASTRAN DMAP functionality is no longer required to prepare the finite element models for SIMPACK. Instead, standard NASTRAN super element techniques may be used. An improved representation of centrifugal forces of flexible bodies at high revolution speeds has been added to the NASTRAN interface.

With SIMPACK 8.9 the actual cross section of SIMBEAM models can be visualised along with displacement contouring if desired.

## AUTOMOTIVE

With SIMPACK 8.9 automotive users can now use a 3D triangular road surface description, ideal for off-road vehicles. Many enhancements to the FTire interface have also been implemented.

## ENGINE

New primitives have been added, enabling quick and easy 3D representation of the individual components, e.g. engine blocks, crankshaft, connecting rods, valves etc. Also two new chain types have been added, the silent (toothed chain) and the SMART chain, which minimises the polygonisation effect. The New IST Tower Version 6.5 for modelling EHD elements has now been implemented. Also advanced modes for the hydraulic lash adjusters (HLA) and chain tensioners are available.

## RAIL

SIMPACK 8.9 is the first release that comes with the redesigned SIMPACK Rail functionality. The main feature is a fast and reliable calculation method for the contact between rail and wheel. The so-called "equivalent-elastic contact" has been implemented in close collaboration with the wheel-rail contact specialist ArgeCare. The new SIMPACK Rail provides an easy-to-use handling of all contact related data and much more flexibility with respect to the kinematic tree, e.g. for independent and resilient wheels. The nearly unrestricted use of Substitution Variables and Substructures allows a clear distinction between vehicle model and simulation scenario. Moreover, the all new internal design allows easy maintainability and extendibility of the contact algorithms.

## WIND

The new rotor blade generator for SIMPACK Wind users is now available. Using simple input tables, flexible rotor blades can be automatically generated which include a three dimensional representation.

Either a "Simple" or "Sophisticated" blade, which includes bend-twist coupling among many other terms, can be easily created. Non-linear bending, geometric stiffening, and shear bending may also be taken into account.

## POSTPROCESSOR

In SIMPACK 8.9 the PostProcessor was expanded with a flexible general ASCII file import mechanism complete with a preview GUI. Readers for SIMPACK afs (array function set), if2 and su2 files and readers for standard measurement data formats .mdf and .tdm (National Instruments) expand the list of supported input data formats. Diagrams with a 1:1 axis ratio have been added, useful for displaying contact surface contours.

Both the result tree and the session tree have been extended with quick search mechanisms, especially useful for large models.

## 3D PLOTTING

Plotting complex 3D simulation results, e.g. frequency and order analysis, run-up simulations, waterfall plots, Campbell diagrams and parameter variation results, is now available with SIMPACK 8.9. Multiple curves can be plotted as either several side-by-side 2D curves or a complete 3D surface. Wire frame and shaded colour contouring, stepped and smooth, are all available.

## 3D ANIMATION

Forces and torques, as well as output values of selected force elements, can now be easily visualised within the 3D animation as scaled force arrows. The desired result channels need only to be dragged and dropped into an animation cell. Overlaying animations with different result files is also now possible. For a simpler and faster navigation of the 3D scene the view handling was reworked to offer even more comfortable panning, zooming and rotating of the scene with the main advancement being an easily definable centre of rotation.

## SIMPACK VIEWER

With SIMPACK 8.9 INTEC launches the SIMPACK Viewer. The SIMPACK Viewer is a lightweight standalone tool for viewing SIMPACK results as 3D animations and curve plots.

The SIMPACK Viewer operates as a standalone application, ideal for sharing animations, as well as a plug-in for Office tools such as Microsoft PowerPoint, Excel and Word and Internet Explorer.

Since it plugs into the MS-Office environment SIMPACK Viewer is ideal for incorporating results and animations directly into presentations and documents. Animations can be visualized by simply loading an sbr file.

The SIMPACK Viewer will be available free of charge with SIMPACK 8.9.

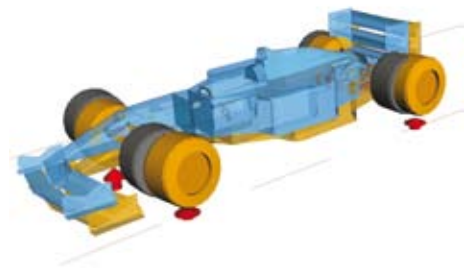


Fig. 4: Animation Overlay