



DIGITAL INDUSTRIES SOFTWARE

# What's New in Simcenter Femap 2301

Experience new levels of collaboration and results exploration

## Benefits

- Direct integration with Teamcenter to facilitate collaboration
- Unified graphics architecture for improved performance
- Streamlined creation of entities for element addition and removal
- Greater flexibility during the Midsurfacing workflow
- Deeper understanding of results via computed vectors

## Summary

Simcenter™ Femap™ software is an advanced finite element modeling (FEM) software application used as a pre- and post-processor for engineering simulation and analysis. Advanced workflows in Simcenter Femap enable analysts to model components, assemblies, and systems, and digitally analyze a model's response under real-world conditions.

Simcenter Femap 2301 introduces key features and updates to enhance your productivity and collaboration, streamlining your design processes for geometry, meshing, analysis, and postprocessing. With the Command Finder, you can save time by quickly and easily searching for current and new commands within Simcenter Femap. Additionally, the Applications Programming Interface (API) has been expanded to provide programmatic access to more functionality for the purpose of automation and customization.

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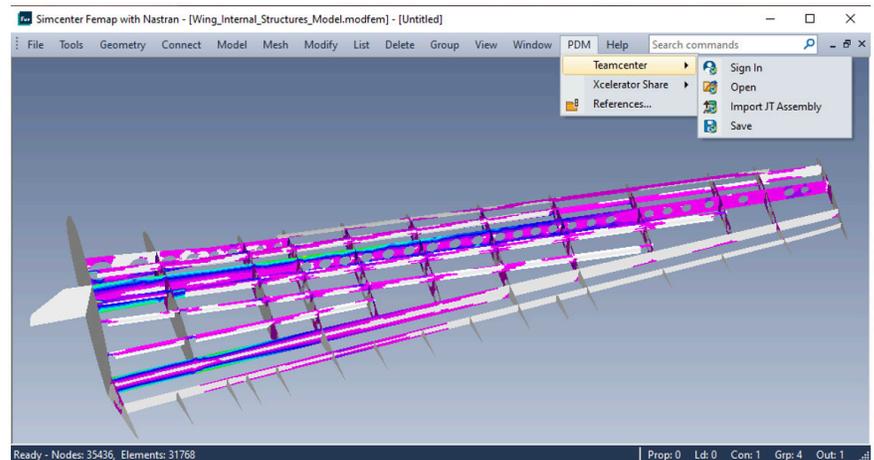
## Features

- Introduction of new unified graphics architecture
- Enhanced meshing with Body Mesher and Mesh on Mesh technology
- Updated support of Simcenter Nastran Multi-Step solutions
- Next-generation cloud collaboration with Xcelerator Share

Simcenter Femap eliminates the need for extensive geometry cleanup and manipulation that is typically required to create a fully connected hex mesh. With automated hex-dominant meshing, you have a set of interactive meshing tools to streamline the process of creating a high-quality mesh. Unlike legacy geometry splitting, hex-dominant meshing of solid geometry in Simcenter Femap now requires little to no simplification or subdivision into smaller and simpler regions.

## Teamcenter integration with Simcenter Femap

Files from Simcenter Femap can be managed within the Teamcenter environment, allowing for the hosting of Simcenter Femap files to be created directly in Teamcenter. These datasets can then be checked in and out, preventing multiple users from editing at the same time. Revisions and the revision history are also documented for all to see, increasing productivity and collaboration across departments. This integration also provides the ability to import assemblies defined with multiple JT geometry files stored within Teamcenter.



Along with Teamcenter commands, the new Product Data Management (PDM) menu also provides access to Xcelerator Share menu and the References command.

## Geometry workflow improvements

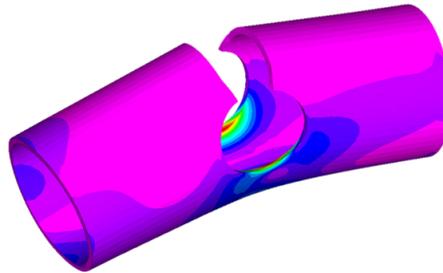
Experience high flexibility during the automatic midsurfacing workflow in Simcenter Femap. The Remove Holes command deletes all internal holes in the midsurface geometry automatically, saving time. The Keep Untrimmed Midsurfaces command identifies midsurfaces not properly trimmed and retains them in the design so you can manipulate these surfaces later in the process.

The added support for reading Points in the Catia V4 direct geometry interface allows for... The tools in the Meshing Toolbox move and project Femap points, modifying curves, surfaces, and solids created with the Standard Geometry engine. The Meshing Toolbox helps ease the process of updating wireframe models, as nodes are moved with the curve elements. The Node commands, standard entity selection dialog, CurvesAsSet and SurfacesAsSet methods on API Point object, and Surfaces and SurfacesAs Set methods on API Curve object can be applied to both Parasolid and non-Parasolid Simcenter Femap geometry.

Various tools in the Meshing Toolbox can now move and project points to modify curves created with Simcenter Femap's Standard geometry engine, which eases the process of updating wireframe models meshed with line elements.

**Preprocessing advancements**

Simulation Entities can be used to perform element addition and removal when using Simcenter Nastran's Multi-Step Nonlinear solution, SOL 401. Two types of Element Add | Remove Entities, ELAR and ELAR2, that can use Time, Inelastic Strain, or Mechanical Strain as criteria to add and remove elements can be created, as can Sets which reference multiple Add | Remove Entities (ELARADD). ELAR entities are created by applying the same criteria to all selected elements, while ELAR2 entities allow for a unique criteria value to be specified for each element involved.



Aero Boxes for Aero Splines can be chosen with the All Boxes option or the Custom option. The All Boxes option chooses all Aero Boxes on the Aero Plane/Body to include in the Aero Spline which enables automatic update of the Aero Spline should the definition of the Aero Panel/Body be modified. Alternatively, the Custom option allows selection of a subset of Aero Boxes on the Aero Plane/Body.

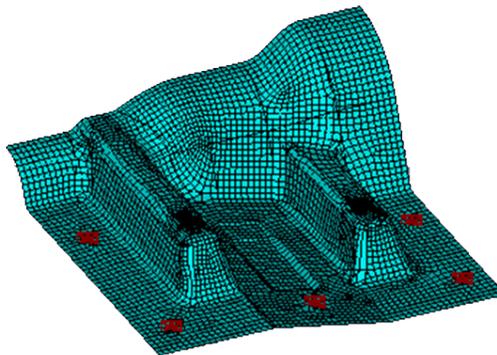
Groups in Simcenter Femap can be modified using several commands. The Condense command changes an existing group to only use rules which reference the IDs of the various entities in the group and now limits those rules to only contain the IDs of existing entities. The new Reduce to Existing command updates each rule currently defined for an existing group to only contain IDs of existing entities, which provides the benefit of retaining the original intent of the group. The Automatic Add command now prevents renumbered entities from being automatically added to the specified group, as the group would then both contain the original and new IDs of the renumbered entities.

For Connection Properties, multiple new options have been added to the both the MultiStep Structural and MultiStep Kinematic tabs.

**Meshing enhancements**

Meshing with Body Mesher in Simcenter Femap now recognizes Mesh Points created using the Mesh Point Editor and incorporating there locations in the generated mesh.

The new Midside Nodes tab available when using the Mesh -> Bodies command now allows the projection of midside nodes toward the associated surfaces and curves based on user-defined options.



The Mesh -> Mesh on Mesh command has been updated to either refine or un-refine an existing mesh containing line element stiffeners. Also, the option on the Line Elements tab controls if adjacent line elements should be treated together or individually during remeshing based on a user-defined value for offsets and orientation.

Added options for Edge Imprinting for various commands on the Mesh -> Mesh Sizing menu and in the Mesh Control Explorer pane which control if imprinting of curves should automatically occur to close small gaps.

The Cohesive Meshing command supports the insertion of cohesive elements at a location where certain portions of the mesh are missing adjacent elements.

### Performance improvements

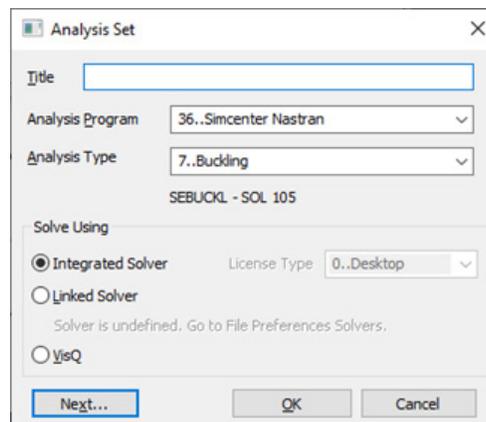
Initial implementation of Unified Graphics Architecture for Simcenter Femap uses a single and simplified method for graphics, designed to provide better quality, performance, and hardware support for graphics. Unified Graphics Architecture currently supports drawing of geometric entities, including points, mesh points, curves, composite curves, surfaces, boundary surfaces, and solids, along with coordinate systems, geometry-based loads, and geometry-based constraints.

### Analysis and Solver Support

Analysis monitoring in Simcenter Femap when analyzing multiple Analysis Sets at once is streamlined to maximize efficiency and reduce time spent waiting for a particular analysis to finish before running another. The Model Info tree contains icons to indicate if the analysis was successful: a green square to indicate the analysis is running, a red square to indicate the analysis is in the queue, a green thumbs up icon to indicate the analysis was completed successfully, and a red thumbs down to indicate the analysis was not completed

successfully. The analysis queue can now also continue running despite a previous analysis failing, cleared at any time, and can automatically load results from a previous analysis when highlighted in the Model Info tree.

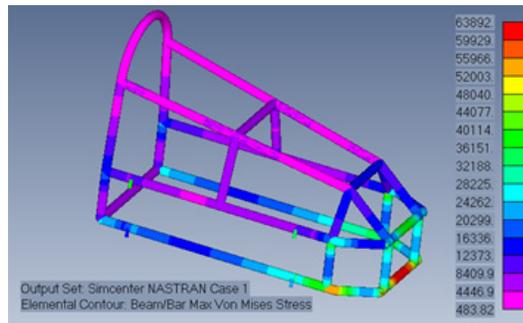
Simcenter Femap supports Simcenter Nastran's simplified user interface for response spectrum application runs, including the RSAPPLY case control command, the RSAPPLY, RSPECTR, and RSPOPT bulk data entries, and several new modal combination methods including CQC, DSUM, GRP, and ROSE.



Output in HDF5 format (NH5RDB specifically) can be requested for MSC Simcenter Nastran via the NASTRAN Output Requests dialog box. Depending on your selected options, the MDLPRM bulk data entry is written with appropriate value for HDF5 param.

**Postprocessing advancements**

The Model -> Output -> Computed Vectors command in Simcenter Femap postprocessing captures additional key results data by computing appropriate output vectors based on results quantities selected from a standard list and/or one that contains user-defined items. The Standard computed vectors include elemental results, plate/solid failure theory, laminate failure theory, and enveloped results. The User Defined computed vectors can be specified via a combination of existing vectors, an envelope of existing vectors, or vectors created via an API script. A library of results quantities to compute can be saved then reloaded to reduce time when performing future computations.



Data Conversion in postprocessing now has five options available for use: average, max absolute value, min absolute value, max value, and min value, which are now supported across Simcenter Femap's various postprocessing capabilities.

**Simcenter Femap and Simcenter Femap XaaS**

Simcenter Femap XaaS delivers everything that our customers already know and love about Simcenter Femap, with the value-added benefits of cloud services through a XaaS subscription offer – making Simcenter Femap more accessible, flexible, and scalable for teams and companies of all sizes.

Simcenter Femap XaaS is not a replacement of the standalone Simcenter Femap product. Instead, it is an opportunity to take advantage of new cloud-based collaboration capabilities through a flexible subscription. With the introduction of Xcelerator as a Service, Simcenter Femap is available to purchase in two different ways: the standalone Simcenter Femap product, or the Simcenter Femap XaaS subscription which includes the full version of Simcenter Femap and the benefits of cloud collaboration with Xcelerator Share. The choice is yours.

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