

SimLab is a process oriented, feature based finite element modeling software that allows you to quickly and accurately simulate engineering behavior of complex assemblies. SimLab automates simulation-modeling tasks to reduce human errors and time spent manually creating finite element models and interpreting results. SimLab is not a traditional off-the-shelf pre- and post-processing software, but a vertical application development platform for capturing and automating simulation processes.

Product Highlights

- Process oriented, feature based finite element modeling software
- Automated mesh generation without CAD geometry cleanup
- Reusable mesh specifications at feature level; for example fillets, cylinders, holes
- Templates for contact detection, bolt, and crankshaft modeling
- Solver interfaces include OptiStruct®, Abaqus, Nastran, and PERMAS

Benefits

Highly efficient, feature based, modeling approach:

- Improves modeling repeatability and quality
- Directly identifies geometry features inside of the CAD environment such as fillets, cylinders, or chamfers

Automates modeling tasks for complex assemblies:

- Meshing
- Assembly of parts and components
- Mesh generation for mating surfaces of an assembly
- Part connections

Accelerates CAE model development for complex assemblies:

- Employs an advanced template based meshing process
- Removes manual mesh clean-up
- Simplifies load and boundary condition definition and generation

Simplified model and assembly modifications:

- Part replacement
- Add or modify ribs within solid models
- Change fillet/cylinder/hole properties
- Fast access to model parameters of DOE studies

SimLab is a CAD and solver neutral modeling environment.

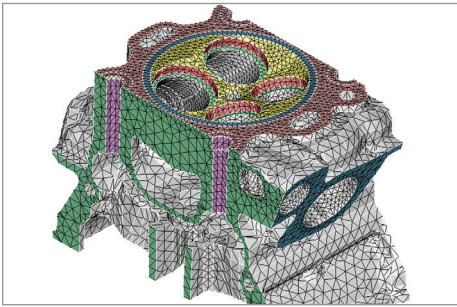
Capabilities

Meshing

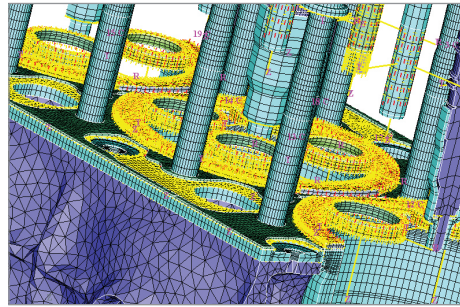
SimLab takes a different approach to generating a high quality mesh. It transfers the features from the CAD model, such as fillets and cylinders, to the finite element model. These features can be used in a later step in the process without the need to access the original CAD geometry again.

There are many unique and useful tools for generating various types of meshes within SimLab. A template system pulls all of these tools together into streamlined

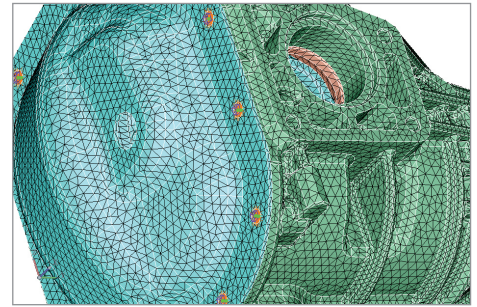
Learn more:
altairhyperworks.com/simlab



Meshing of complex assemblies



Automatic template based contact creation



Meshed transmission housing

and automated processes geared towards generating the highest quality mesh that adheres to requirements of any analysis type: NVH, durability, fatigue, CFD, and more.

Automated mesh generation

- Tetra and hexa meshing of solids
- Quad and tria meshing of surfaces
- 1D mesh creation for joining parts and contact surfaces

Feature based meshing

- Automatically identifies CAD features
- Applies template criteria to mesh creation of features, such as cylinders, fillets, holes
- Automatic recognition of contact surfaces
- Analysis and criteria based meshing uses templates and captured knowledge to generate appropriate meshes for each analysis type, for example stress, NVH, acoustic, fatigue, and others

Geometry

SimLab uses a unique methodology in working with CAD geometry to generate an accurate mesh quickly. The processes used by SimLab make it possible to eliminate all

geometry clean-up which enables users to focus on the mesh generation procedures instead of healing poor geometry.

SimLab contains routines to directly access the native geometry of the following CAD systems:

- CATIA V5
- Pro/Engineer
- UG
- Any Parasolid based CAD systems such as SolidWorks, SolidEdge, etc.

Managing Assemblies

- Robust and comprehensive toolset for handling a full system of components.
- Recognition of mating components and contact surfaces
- Quick assignment of boundary conditions to many groups within an assembly
- Library of common connecting elements

Loads and boundary conditions

When working with complex models and assemblies the average model size can easily reach millions of elements and nodes. At this point it is no longer practical to apply boundary conditions on an individual node or element basis. SimLab provides a host of

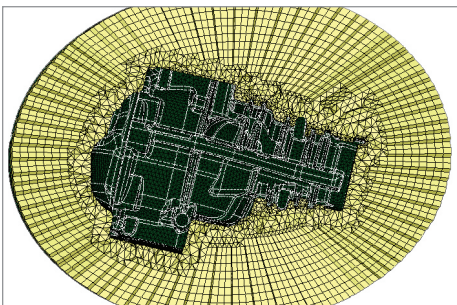
advanced tools and utilities that guide users through automated processes to manage this task easily.

Process oriented features

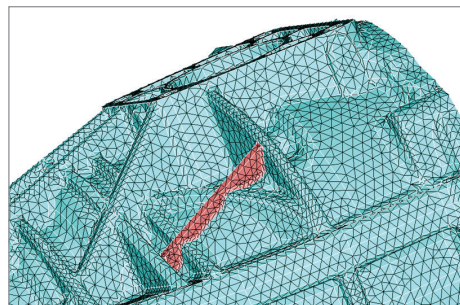
- Mapping of results from a fine to a coarse mesh and from a coarse to a fine mesh
- Menu driven modeling of bearings and applying bearing pressure
- Positioning of spatially displaced result fields onto the model. (Example, thermal analysis results onto a structural model)
- Automated templates for
 - Bolt modeling
 - Gasket, bearing loads and joint modeling
 - Mass property idealization
 - External material and property based connections
 - Contact detection (between parts) and modeling of the contacts
 - Condensation model preparation for AVL Excite

Post-processing

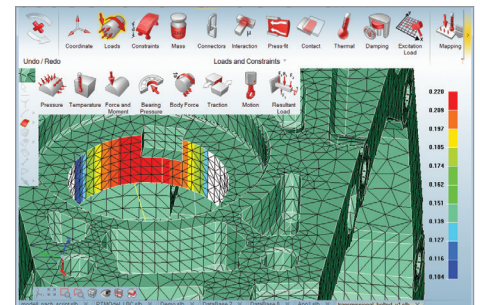
SimLab includes an integrated post-processor. In addition, customized processing tools such as bore distortion and frequency response are available.



Elliptical mesh generation for acoustic simulations



Modifications on existing mesh



Bearing pressure contour