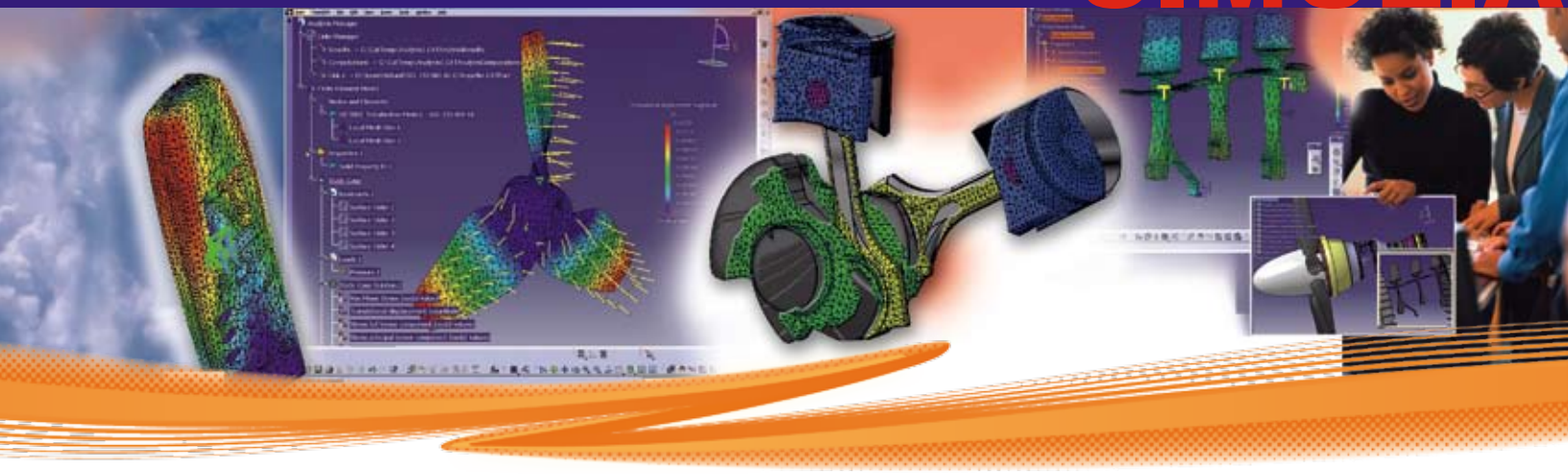


FEM Solid (FMD)

Provides advanced meshing for complex solid parts

Overview

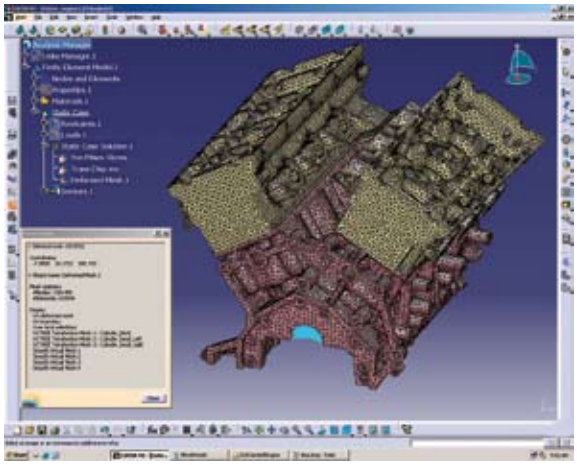
FMD provides advanced meshing capability for complex solid parts. It is fully associative with the geometry and provides more control and more sophisticated meshing algorithms than the standard solid meshing capability in GPS.

FMD is intended for the specialist that wants to mesh complex solid geometry quickly and efficiently while retaining a lot of control over the resulting element quality and the number of elements in the mesh. FMD provides a tetrahedral filler meshing algorithm and also provides tools to create hexahedral meshes. Various pre-defined and customizable criteria for mesh quality can be displayed.

Product Highlights

- Includes a tetrahedral filler algorithm with full mesh control.
- Allows the creation of hexahedral meshes.
- Meshes are fully associative with the geometry.
- Visualization and analysis of mesh quality.
- Automated meshing using Knowledgeware.

GPS is the backbone of the CATIA V5 Analysis solution. The other five CATIA Analysis products are combined with GPS to extend its integrated analysis capabilities.



Engine assembly meshed using the tetrahedral filler algorithm

SIMULIA

Features and Benefits

In addition to the functionalities and benefits provided by Generative Part Structural Analysis (GPS), FEM Solid (FMD) offers:

Tetrahedral filler algorithm

The Octree meshing capability in GPS is robust and intended to generate high quality meshes quickly. In addition, FMD offers a tetrahedron filler meshing option that provides additional options to ensure a quality mesh. The tetrahedral filler works in conjunction with the FEM Surface (FMS) product by meshing all the surfaces of the solid with triangles and then using the resulting surface mesh to fill the interior with tetrahedral elements. This allows all the surface meshing tools in FMS to be used to ensure a high quality initial surface mesh. Surface meshes can also be imported and filled using FMD.

Hexahedral meshing

FMD allows solid meshes to be created from surface meshes by sweeping along a line or around an arc, allowing specialists to quickly create complex solid hexahedral meshes.

Quality analysis and mesh editing

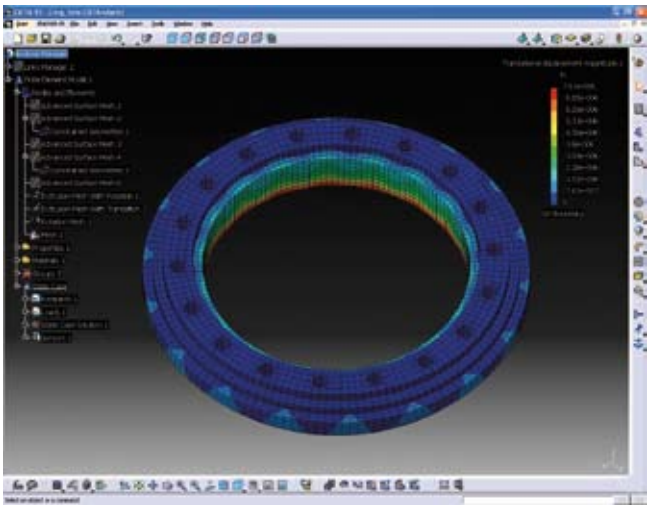
The quality of the mesh can be visualized directly on the mesh. Elements not conforming to the selected quality criteria can be grouped, making it easier to modify them. The quality criteria dynamically update as the user edits the mesh by interactively moving nodes on the geometry, editing elements (splitting, swapping, etc.), or smoothing the mesh. The auto-focus capability saves considerable time by automatically identifying the areas to be improved.

Knowledge-based technology

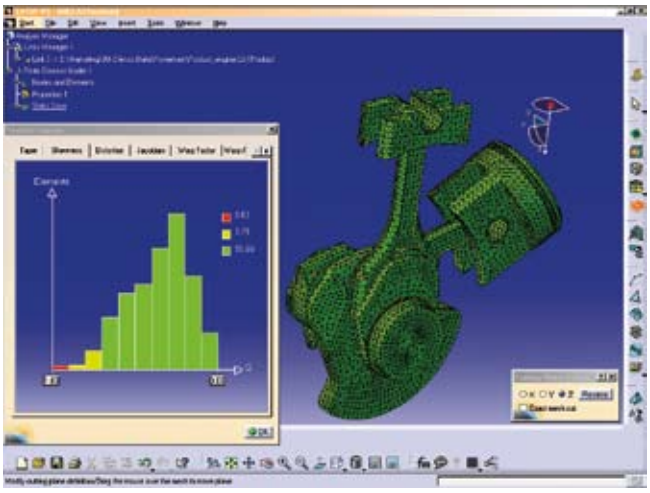
The specification parameters of FMD (including the meshing domain, node distribution, meshing capture tolerance, meshing size, etc.) are available as knowledge parameters. As a result, they can be used to produce advanced parameterized models to automate the meshing process and to ensure compliancy with corporate standards.

Flexible quality analysis reports

The analysis of the mesh is provided in charts and text. Users can filter information provided in the report by quality criterion or by finite element type. If the quality criterion is chosen, users can obtain the percentage of the mesh's finite elements that respect the threshold value for each criterion. When sorted by finite element, users will see the results of the quality evaluation for each finite element. This capability enhances communication between users or groups of users, which is especially important with large part assemblies.



Mounting ring meshed with FMD to create an organized and associative hexahedron mesh



Finite element model of a piston/crankshaft assembly

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