

# CATIA V6 Advanced FE Modeling (AFE)

Advanced wireframe, surface, and solid meshing capabilities for complex geometries

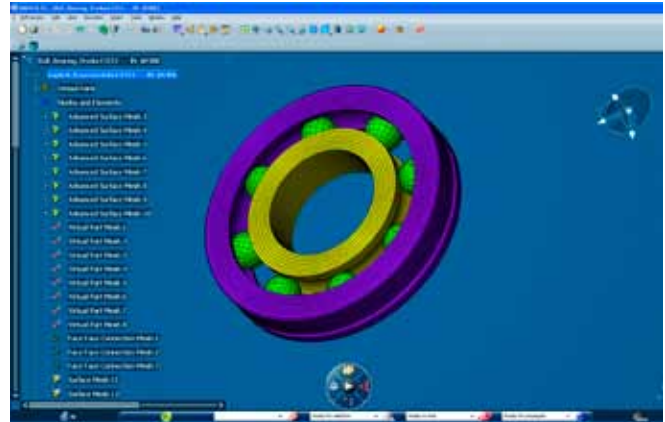
## Make CAD-Integrated Advanced Meshing Work for You

Global competition requires the creation of better products faster and at lower costs without sacrificing quality. CAD-integrated advanced meshing provides benefits for analysts in terms of efficiency, reliability and lifecycle management. Meshes generated in a CAD-integrated environment are fully associative with the geometry—saving time, ensuring synchronization between mesh and geometry, and providing consistent management of valuable meshing IP.

Performing simulation earlier in the design phase with industry-proven, design-integrated analysis technology can provide significant time and cost savings.

## About CATIA V6 Advanced FE Modeling

CATIA Advanced FE Modeling offers meshing capabilities for specialists who require high-quality meshes of complex wireframe, surface, and solid parts. Complex parts can be meshed automatically or using a number of manual meshing tools that provide a high degree of control over the meshing process. The solution supports creating finite element models with assembly joints and other fasteners, including spot seam and surface welds. It also provides tools to analyze mesh quality according to pre-defined and customizable criteria.



Using the sweep tool, hexahedron meshes are generated on the ball bearing rings for maximum accuracy.

## Features & Benefits

- Advanced meshing of surfaces based on geometry simplification ensures that small geometric features do not adversely affect element size and quality.
- High-quality solid meshing, using techniques such as tetrahedron filler meshing, sweep 3D meshing, and mesh transformation and extrusions, allows users to create reliable meshes with a high degree of user control.
- Mesh associative with the design ensures that any changes to the geometry automatically cause the mesh to be updated so that the mesh and the geometry always remain in sync.
- Local mesh constraints can be applied quickly and easily facilitating user control over meshes on complex surface parts and to impose mesh constraints required when modeling connections, such as spot welds and flexible joints.
- Customizable mesh quality analysis provides a thorough understanding of overall mesh quality and individual element quality with respect to user-defined quality criteria.
- Integration with Knowledgeware technology enables mesh specifications to be defined with knowledge-based parameters, ensuring compliance with corporate standards and the experience of expert analysts.

# CATIA V6 AFE Highlights

## Mesh associativity

- Any changes to the geometry automatically cause the mesh to be updated.
- Reference geometry is never modified during the meshing process. Geometry simplifications necessary for meshing are handled without impacting the reference model.

## Compatible and incompatible meshing

- Meshes on different parts can be generated independently or with influence on each other to create compatible meshes.
- Welds and other connections that occur in large quantities can be handled readily in AFE.

## Knowledge-based technology

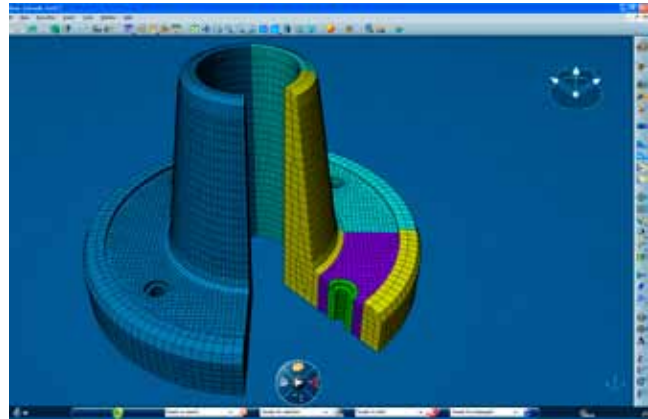
- Mesh specifications—such as meshing domain, node distribution, mesh capture tolerance, element sizes, etc.—are available as Knowledgeware parameters.
- Highly customized and robust meshing methods can be applied to models to ensure meshing standards are met.

## Quality analysis and mesh editing

- Mesh quality can be visualized directly on the mesh, with non-conforming elements conveniently grouped and viewable.
- Mesh editing tools can be used interactively while checking element quality.

## Mesh as a PLM entity

- Mesh lifecycle can be managed separately from the design model.
- Several FE models can be created to correspond to different analyses on the same product.



*A smooth and very regular hexahedron mesh can be created using operation tools such as revolve and symmetry.*

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