

**Abaqus/CAE**

Version 6.7

**Geometry****Geometry Creation Tools**

- Solid features
  - Extrude
  - Loft
  - Revolve
  - Sweep
  - Draft, twist, and pitch
  - Fillet/Chamfer
- Cut features
  - Extrude
  - Loft
  - Revolve
  - Sweep
  - Circular hole
- Shell features
  - Planar surface
  - Extrude
  - Loft
  - Revolve
  - Sweep
  - Fillet/Chamfer
- Wire features
  - Planar
  - Poly line
  - Spline
- Datum geometry
- Partitioning tools
  - Edge
  - Face
  - Cell

**2-D Sketcher**

- Point
- Line
- Circle
- Rectangle
- Arc
- Fillet
- Spline
- Ellipse

**Sketch Tools and Options**

- Constraints
- Parameters
- Translate/Rotate/Mirror/Scale
- Trim/Extend/Break/Merge
- Project edges
- Offset entities
- Linear/Radial pattern
- Dimensioning
- Construction geometry
- Sketch import/export

**Geometry Import/Export**

- CAD Associative Interfaces (add on modules)
  - CATIA V5
  - Pro/ENGINEER
- CAD geometry translators (add-on modules)
  - CATIA V4
  - IDEAS NX
  - Parasolid
- Assembly import
- Neutral format import
  - SAT, IGES, STEP, or VDA
- Import of parts from Abaqus input (.inp) files or output database (.odb) files
- Geometry export
  - SAT, IGES, STEP, VDA

**Geometry Repair Tools**

- Automated repair during import
- Repair small edges
- Merge edges
- Repair invalid edges
- Remove redundant entities
- Repair small faces
- Replace faces
- Repair sliver
- Remove faces
- Create face
- Solid from shell
- Stitch edges
- Repair face normals
- Convert to analytical
- Convert to precise

**Assembly****Instance Tools**

- Create/suppress/resume/delete
- Linear/radial pattern
- Translate/rotate
- Replace
- Query

**Sets and Surfaces**

- Geometric sets containing vertices, edges, faces, skins or cells
- Orphan mesh sets containing nodes or elements
- Surface regions
- Merge sets/surfaces

**Display Groups**

- Display subset of model

**Color Coding**

- Display model geometry and mesh elements in configurable colors
- Color by attribute

**Merge/Cut Tools**

- Geometric parts
- Merge orphan mesh

**Properties****Material Models**

- General
- Elasticity
- Electrical properties
- Mass diffusion
- Plasticity
- Pore fluid properties
- Thermal properties
- Gasket
- Acoustic medium
- Damage initiation criteria and evolution
- Brittle cracking
- Equation of state (EOS) materials
- User materials
- Hyperelastic/Viscoelastic material evaluation

**Sections**

- Solid
  - Homogeneous
  - Generalized plane strain
- Shell
  - Homogeneous
  - Composite
  - Membrane
  - Surface (rebar layers)
  - Shell offset
- Beam
  - Beam
  - Truss
  - Other
  - Gasket
  - Cohesive
- Gasket
- Beam section profiles
  - Profile library
  - Arbitrary
  - Generalized
  - Profile visualization

**Composites**

- Ply layout definition and management
- Ply stack plots
- Classic laminate theory
- Non-linear progressive damage and failure
- Ply-based output request



**Orientations**

- Beam section
- Material
- Rebar
- Shell normal

**Special Engineering Features**

- Skins and stringers
- Inertia
  - Point mass/inertia
  - Nonstructural mass
  - Heat capacitance
- Springs/dashpots

**Analysis Support**

- General, Linear and Nonlinear Analyses
  - Static stress/displacement analysis
- Viscoelastic/viscoplastic response
- Dynamic stress/displacement analysis
- Heat transfer analysis
  - (transient and steady-state)
- Mass diffusion analysis
  - (transient and steady-state)
- Acoustic analysis
- Coupled problems
  - Thermo-mechanical
  - Thermo-electrical
  - Piezoelectric
  - Pore fluid flow-mechanical
  - Thermo-mechanical mass diffusion
  - Shock and acoustic-structural

**Linear Perturbation Analyses**

- Static stress/displacement analysis
  - Linear static stress/displacement analysis
  - Eigenvalue buckling estimates
- Dynamic stress/displacement analysis
  - Natural frequency extraction
  - Complex eigenvalue extraction
  - Transient response via modal superposition
  - Steady-state response to harmonic loading
  - Response spectrum analysis
  - Random response analysis

**Analysis Controls**

- General solution controls
- Solver controls
- Adaptive mesh domain
- Adaptive mesh controls

**Output Requests**

- Field output
- History output
- Integrated output sections
- Restart, diagnostic, and monitor output

**Constraints and Interactions**

**Contact**

- Automatic contact detection and setup
- General contact (Abaqus/Explicit)
- Surface-to-surface contact
- Self-contact

**Contact Properties**

- Mechanical
  - Normal
  - Tangent
  - Damping
  - Clearance-dependent
- Thermal
  - Conductance
  - Heat generation
  - Boundary radiation
- Film coefficient
- Actuator/sensor

**Interactions**

- Elastic foundations
- Actuator/sensor

**Constraints**

- Tied surfaces
- Equations
- Display body
- Rigid and isothermal bodies
- Coupling
- Shell-to-solid coupling
- Embedded regions

**Loads**

- Mechanical
- Bolt load
- Thermal
- Acoustic
- Fluid
- Electrical
- Mass diffusion
- Fields
- Multiple load cases
- Spatially varying loads

**Connectors**

- Basic
  - Translational
  - Rotational
- Assembled/Complex
- Slip-ring

**Boundary Conditions**

- Nodal
- Velocity
- Acceleration

- Velocity/angular velocity
- Submodel
- Pore pressure
- Electric potential
- Temperatures
- Predefined fields
- Initial state (from previous analysis)

**Fracture Mechanics**

- Seams
- Cracks

**Meshing**

**Mesh Seeding**

- Global seed size
  - Curvature based refinement
  - Minimum element size
- Edge seed
  - Uniform
  - Biased
  - By size
  - By number

**Structured Meshing**

- 1-D
- 2-D regions
- 3-D solid regions

**Surface Meshing**

- Automatic quadrilateral meshing
  - Medial axis
  - Advancing front
- Automatic triangular meshing

**Solid Meshing**

- Fully automatic tetrahedral meshing
- Fully automatic swept meshing
  - Medial axis
- Bottom-up hexahedral meshing

**Virtual Topology**

- Combine faces/edges

**Element Quality Checks**

- Statistical and analysis
- Stable time increment
- Maximum allowable frequency

**Mesh Edit**

- Node
  - Create
  - Edit
  - Delete
  - Merge
  - Adjust midside
  - Project nodes



- Element
  - Create
  - Delete
  - Flip surface normal
  - Orient stack direction
  - Collapse/split edge
  - Swap diagonal
  - Split/combine element
- Offset (create shell/solid layers)
- Automatic collapse of sliver edges
- Convert triangular elements to tetrahedral elements
- Refine 2-D planar meshes

## Adaptive Remeshing

- Automatic and Manual

## Element Library

- Beam
- Truss
- Connector
- Shell
- Membrane
- Cohesive
- Continuum shell
- Continuum
- Elbow
- Gasket
- Pipe

## Job Management

- Submission
- Parallel computing options
- Restart
- Monitoring

## Visualization

- Model plotting
- Deformed, contour, vector/tensor, path, extreme value, ply-stack, through-thickness, tick mark, overlay, material orientations, X-Y plots
- Loads display
- View manipulation and camera options

- Multiple viewports and view synchronization
- Automatic color coding
- View cuts
  - Planar/cylindrical/spherical
  - Isosurface
- Animations
  - Movie import/export & overlay
- Mirroring and patterning of symmetric models
- Failed element removal
- Stress linearization
- Data filtering
- Tabular data reports
- Probe/query tools
- Network connection to remote output databases
- Diagnostics visualization

## Process Automation

- Python scripting
- GUI toolkit
- Macro manager
- Plug-ins architecture

## Printing

- PS/EPS
- PNG
- TIFF
- SVG

## Output

- 3D XML
- VRML
- Hardcopy

## Documentation and Online Help

- User's Manual
- Getting Started Manual
- Tutorials
- Release Notes

## Hardware Compatibility

- Intel Pentium
  - Windows 2000/XP/Vista
  - Linux

- Intel EM64T
  - Linux
- AMD Opteron
  - Linux

## Product Support

- Maintenance & Support
- Quality Monitoring Service
- Installation
- Training & Users' Meetings

## Related Products

### DDAM for Abaqus

- Collection of response spectrum procedures
- DDAM-specific input forms
- Specialized DDAM output data

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