Innovative finite element modeling program
VisualFEA

- **VisualFEA** is an innovative program for finite element analysis, which is an advanced technique to solve and analyze physical problems arising in many fields of science and engineering.

- **VisualFEA** is a full-fledged software integrated with ease-of-use but powerful functions for pre- and post-processing as well as for finite element processing.

- **VisualFEA** has the greatest advantage in its intuitive and creative user-interface differentiated from any other software of the same kind.

- **VisualFEA** has innovative modeling capabilities such as mesh intersection, mesh operation and mesh carving for fast and sophisticated construction of complicated models.

- **VisualFEA** can perform structural, heat conduction, and seepage analysis either separately or in coupling. VisualFEA has various special elements including embedded bars which facilitate modeling and analysis of complex problems.

- **VisualFEA** has many useful and spectacular functions of postprocessing. The data obtained from finite element analysis are visualized in various forms: contour, isosurface, vector, animation and so on.

- **VisualFEA** has functions for studying finite element analysis. The various computational aspect and concepts involved in finite element modeling can be easily understood through computational simulation.

Features

Preprocessing

Mesh generation (auto mesh, intersection, operation, carving), assignment, staged model sequence

Postprocessing

Contour, graph, diagram, level surface, isosurface, slicing, vector representation, animation
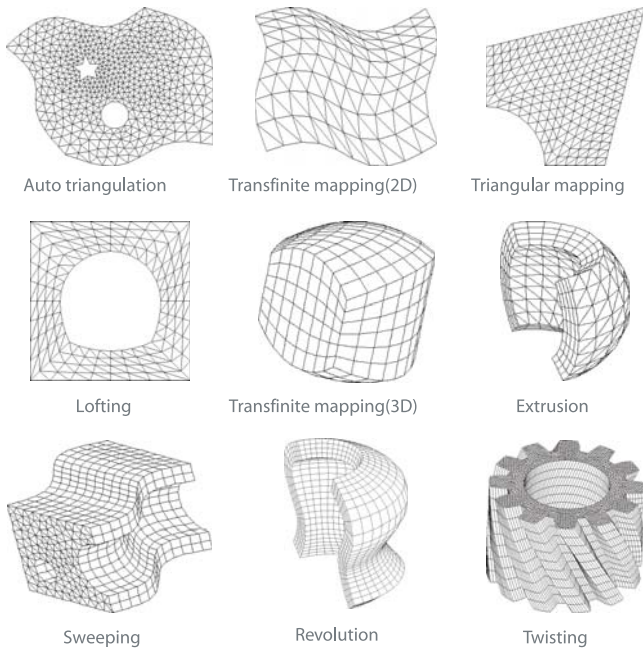
Analysis

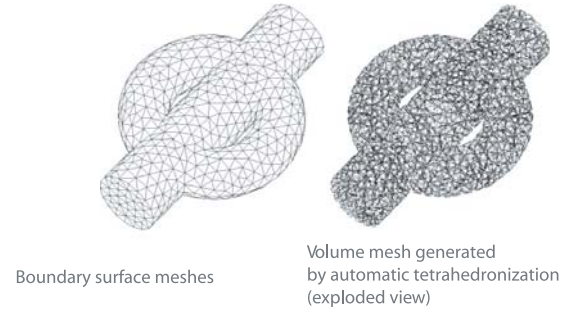| Structure	Heat conduction	Seepage	Coupled analysis
linear static	steady state	steady state	structure and heat conduction
nonlinear	transient	transient	structure and seepage
dynamic		confined	
sequentially staged		unconfined	
adaptive			

Educational ability

Computer simulation of finite element process to aid understanding of various concepts including shape functions, element equations, assembly and solution of system equation, stress smoothing, eigen value analysis, convergence characteristics and so on.
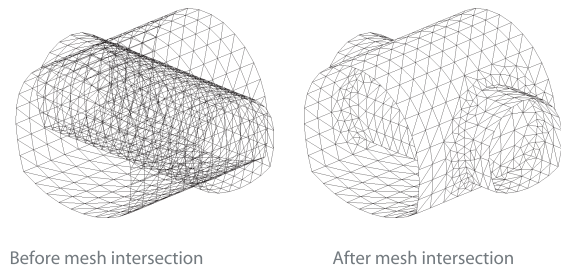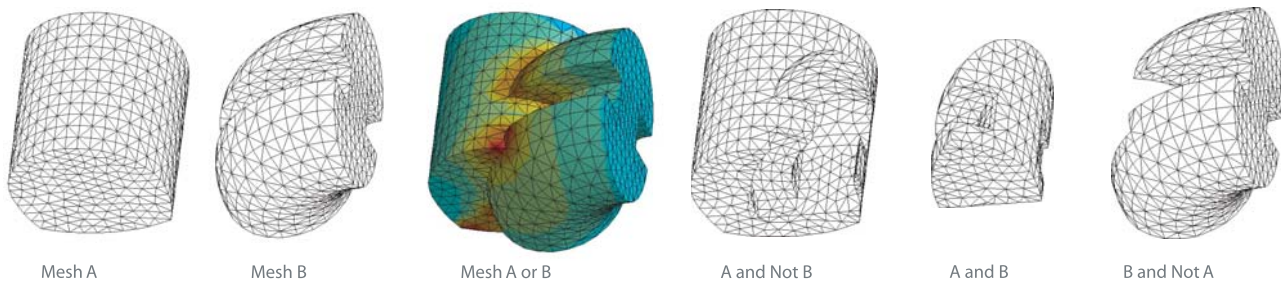
Basic mesh generation functions

Auto triangulation

Transfinite mapping(2D)
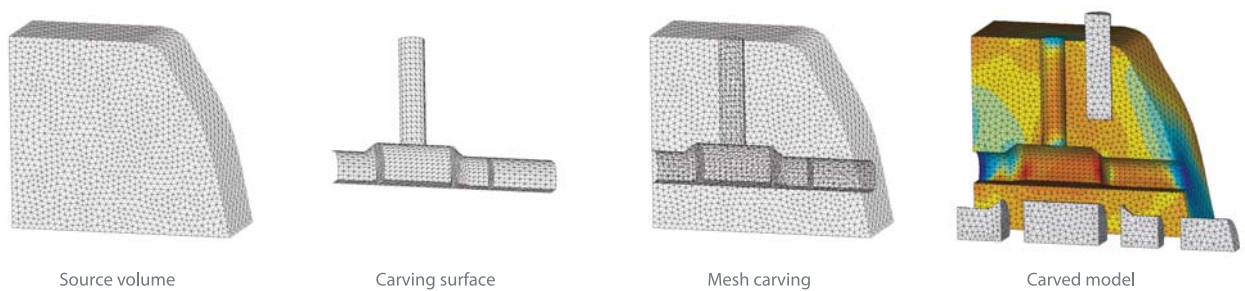
Triangular mapping

Lofting

Transfinite mapping(3D)

Extrusion

Sweeping

Revolution

Twisting

Automatic mesh generation of 3-D volume

Boundary surface meshes

Volume mesh generated
by automatic tetrahedronization
(exploded view)

Mesh Intersecion

Before mesh intersection

After mesh intersection

Mesh Operation

Mesh A

Mesh B

Mesh A or B

A and Not B

A and B

B and Not A

Mesh Carving

Source volume

Carving surface

Mesh carving

Carved model

Sequentially staged modeling

base model

sharing data

stage6

stage5

inheriting data
sharing
data

stage4

stage3

stage2

stage1

inheriting data

inheriting data

inheriting data

inheriting data

stage models

inheriting data

Postprocessing of a sequentially staged model

Contouring of 3-D models

Stress   Temperature   hydraulic head
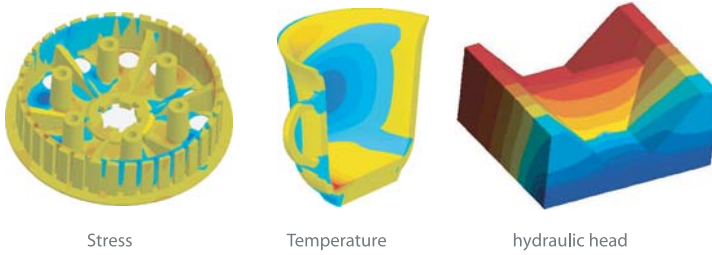
Stress contours with adaptive mesh refinement
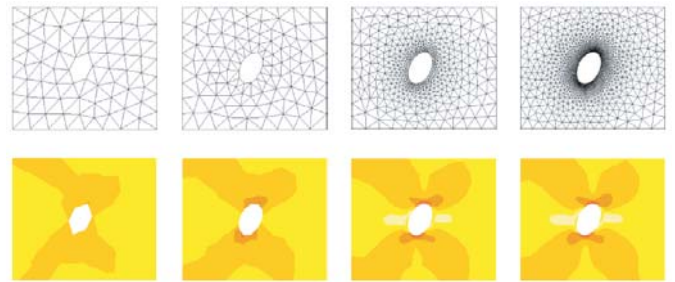
Slicing of 3-D volume to visualize inside data
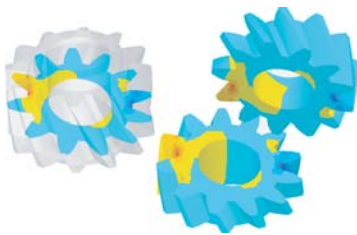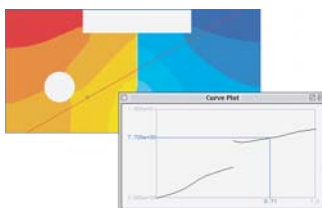

Representaion of scalar data by level surfaces
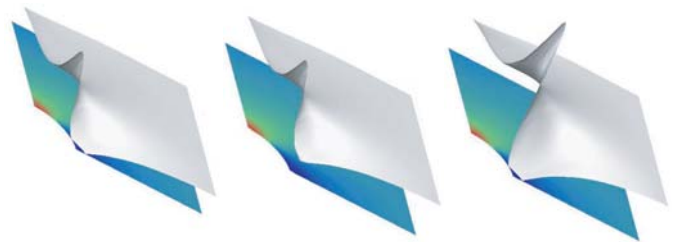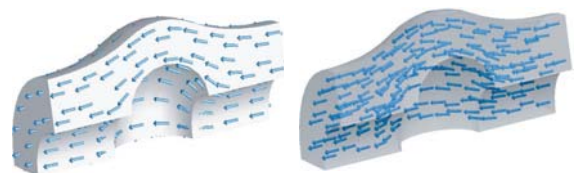

3-D volume data representation by isosurfaces
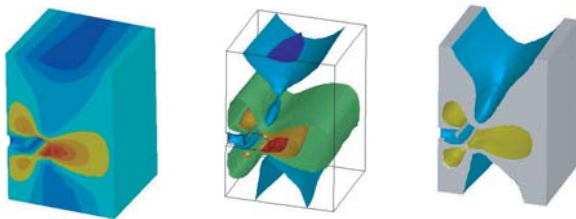
Methods of rendering data inside of 3-D volume
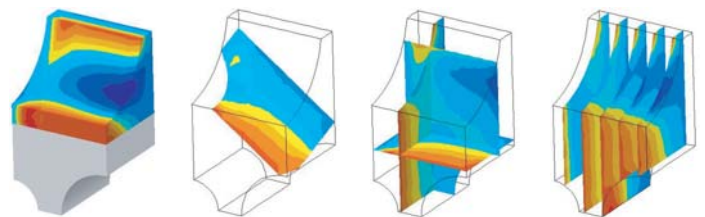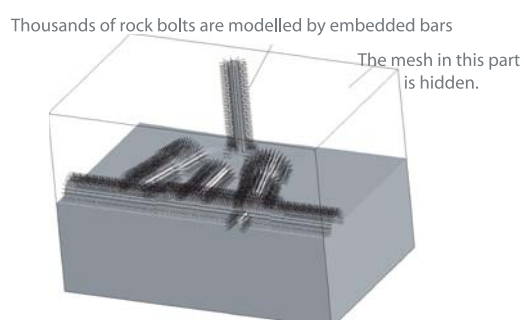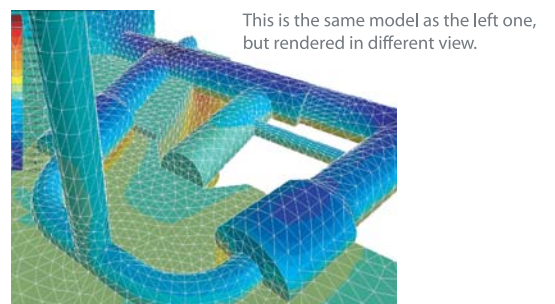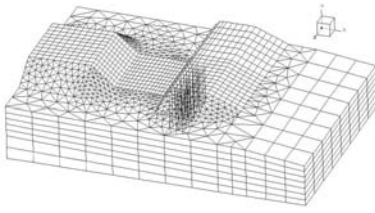

Curve plotting

3-D vector data representation
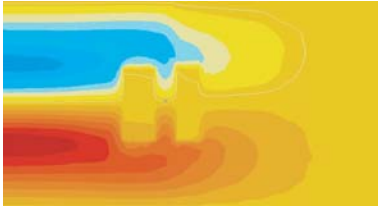

Modeling of rock bolts using embedded bars

Thousands of rock bolts are modelled by embedded bars

The mesh in this part is hidden.

Postprocessing of 3-D tunnel analysis

This is the same model as the left one, but rendered in different view.
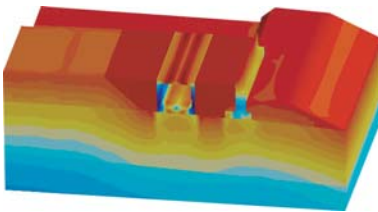
Embankment

3-D model

Base section view
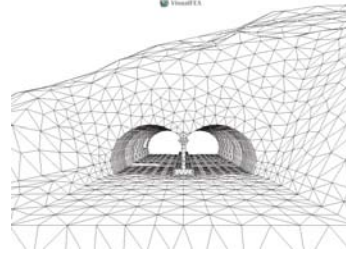of displacement contour
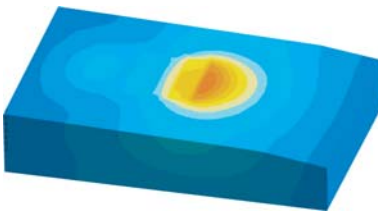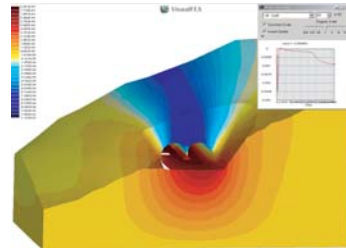
Displacement contour
at mid-construction
stage

Overall view
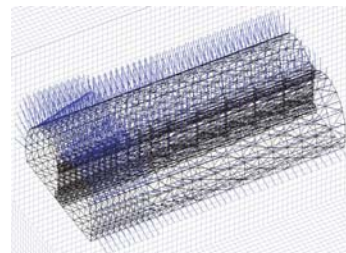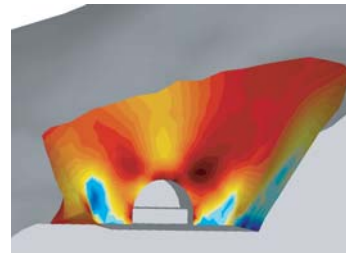stress distribution

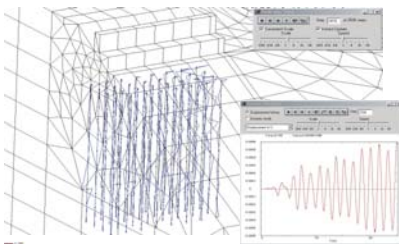## Tunnel

3-D model

Nonlinear stress behavior
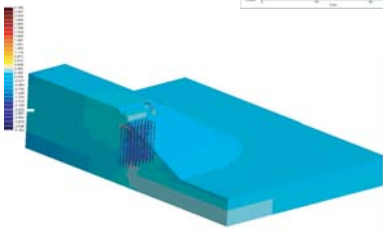
Rock bolt modeling using
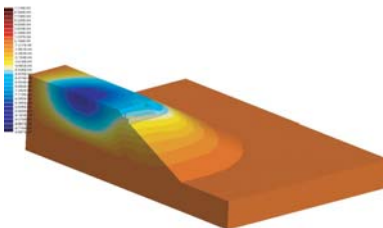embedded bar elements

Stress distribution
on the surface of slope

Vibration of piles

View of
dynamic response

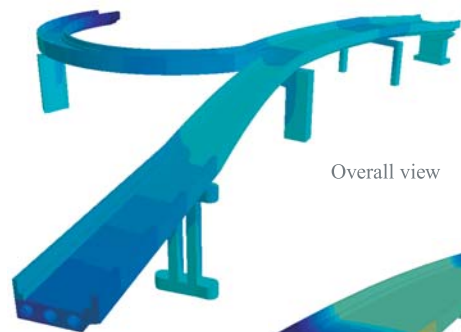Stress contour

Displacement contour

Overpass bridge

Overall view

Section detail