

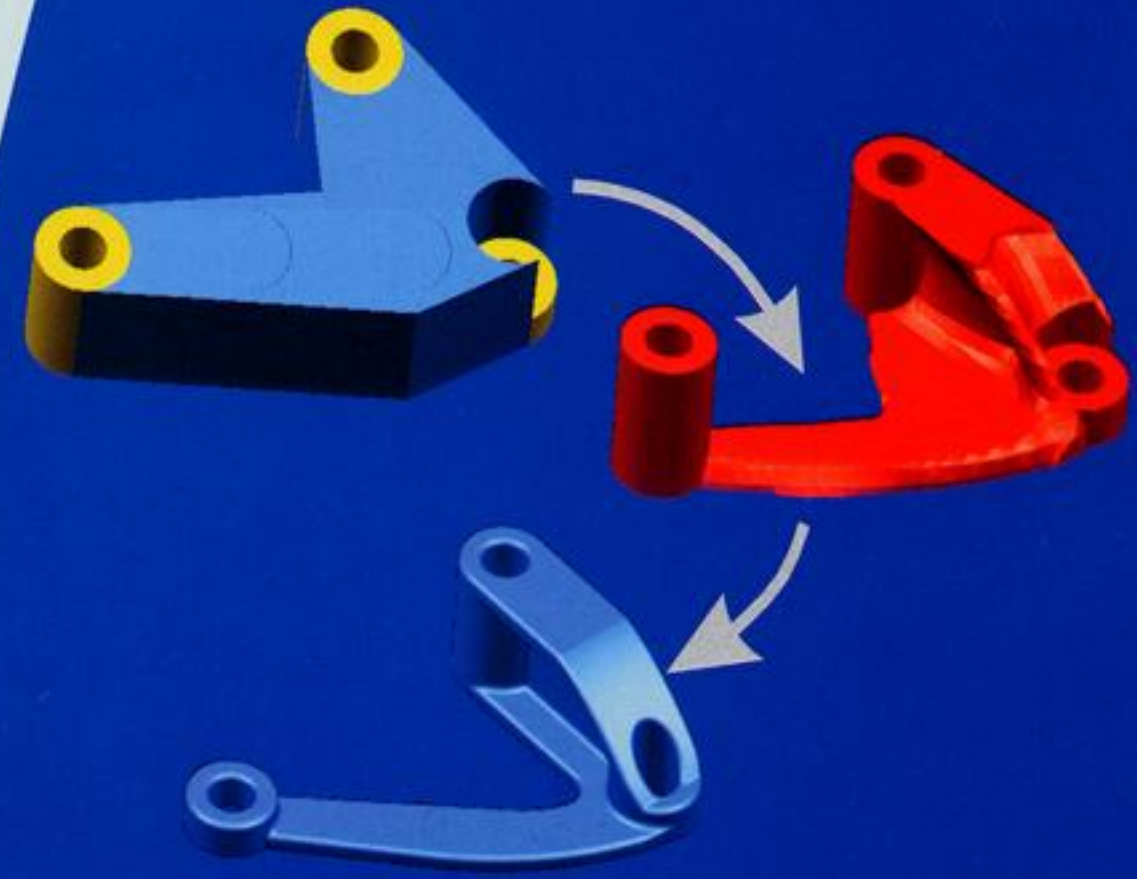
IsboM

PERMAS

Topology Optimization

Ideally suited for the early design phase:

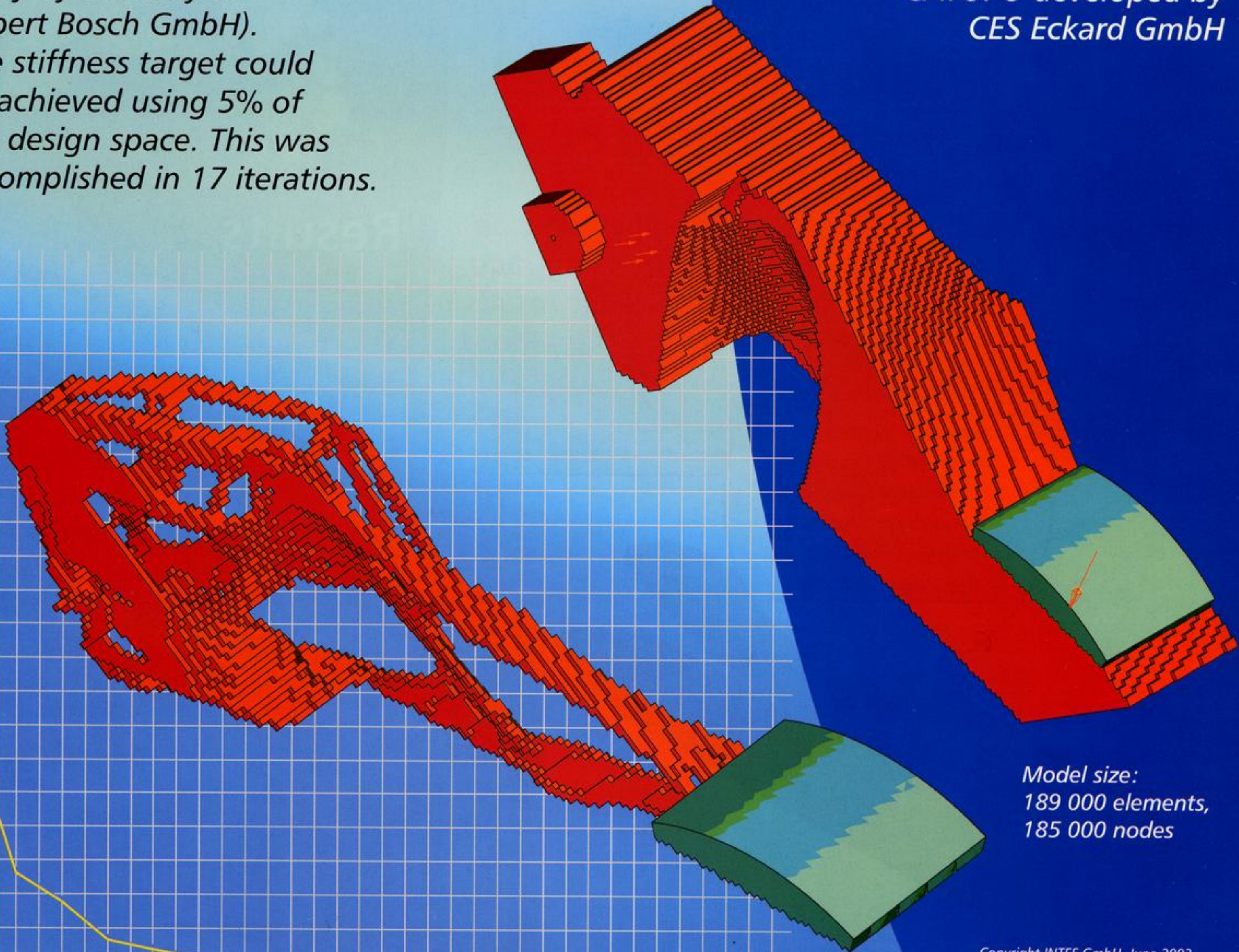
- *Design space specification with variable and fixed parts*
- *Large models with all relevant structural details*
- *Contact analysis included*
- *Highly efficient algorithms and parallelized execution*



*PERMAS Topology Optimization
in CATIA with the user interface
CATOPO developed by
CES Eckard GmbH*

*Topology optimization of a
gas pedal (iViP project
study by courtesy of
Robert Bosch GmbH).*

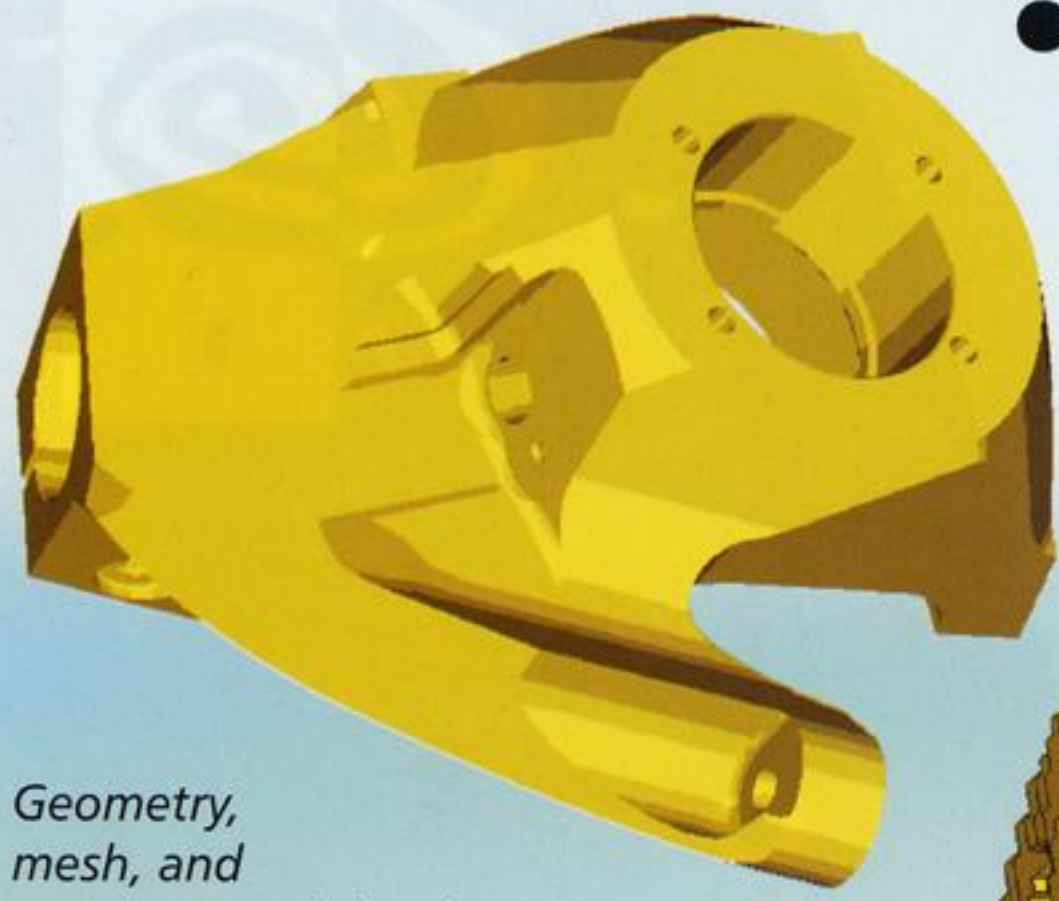
*The stiffness target could
be achieved using 5% of
the design space. This was
accomplished in 17 iterations.*



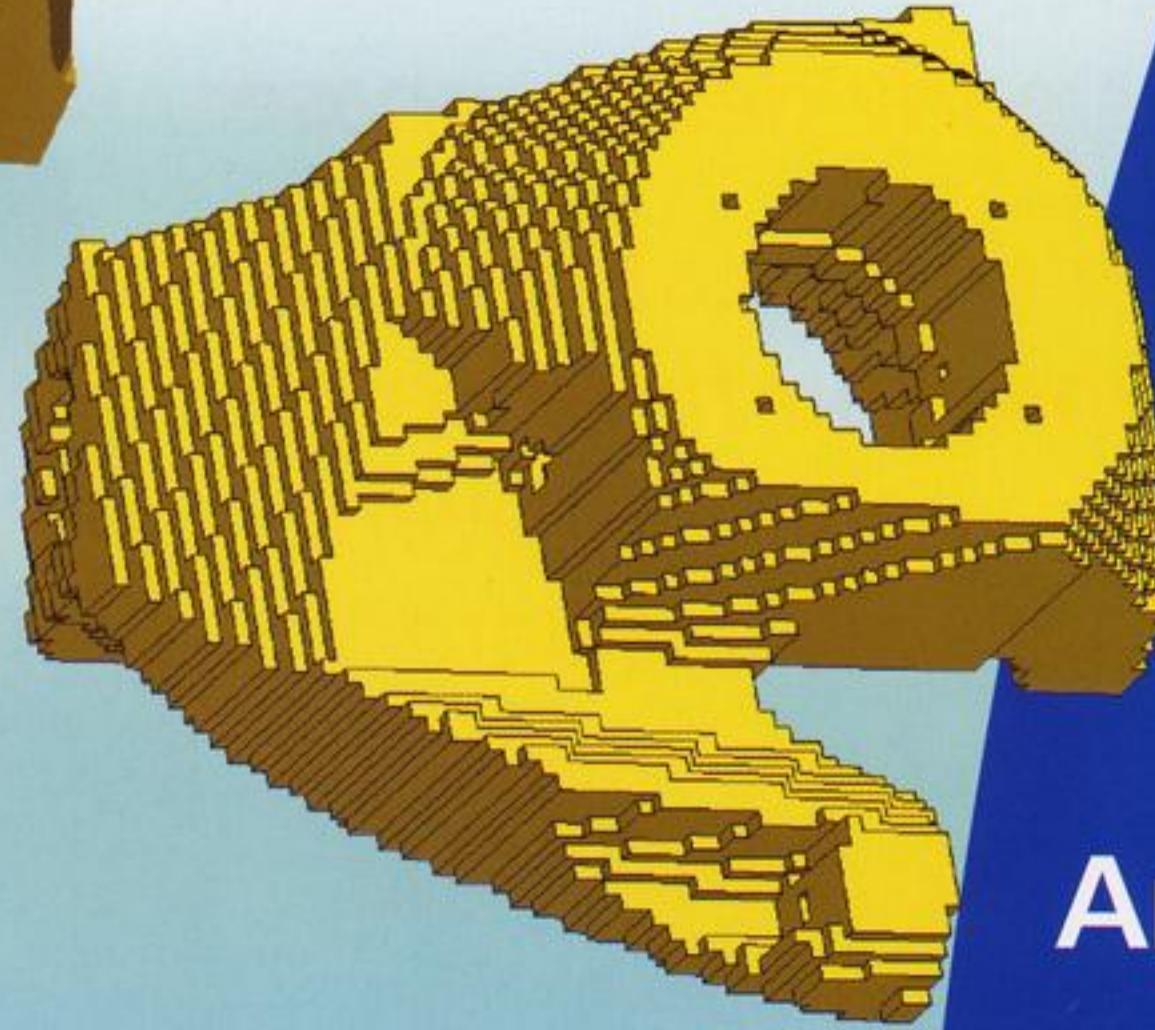
*Model size:
189 000 elements,
185 000 nodes*

Model

- Filling ratio adjustable per design element
- Compliance and eigenfrequency as design objective
- Different loading cases
- Target definition with remaining volume

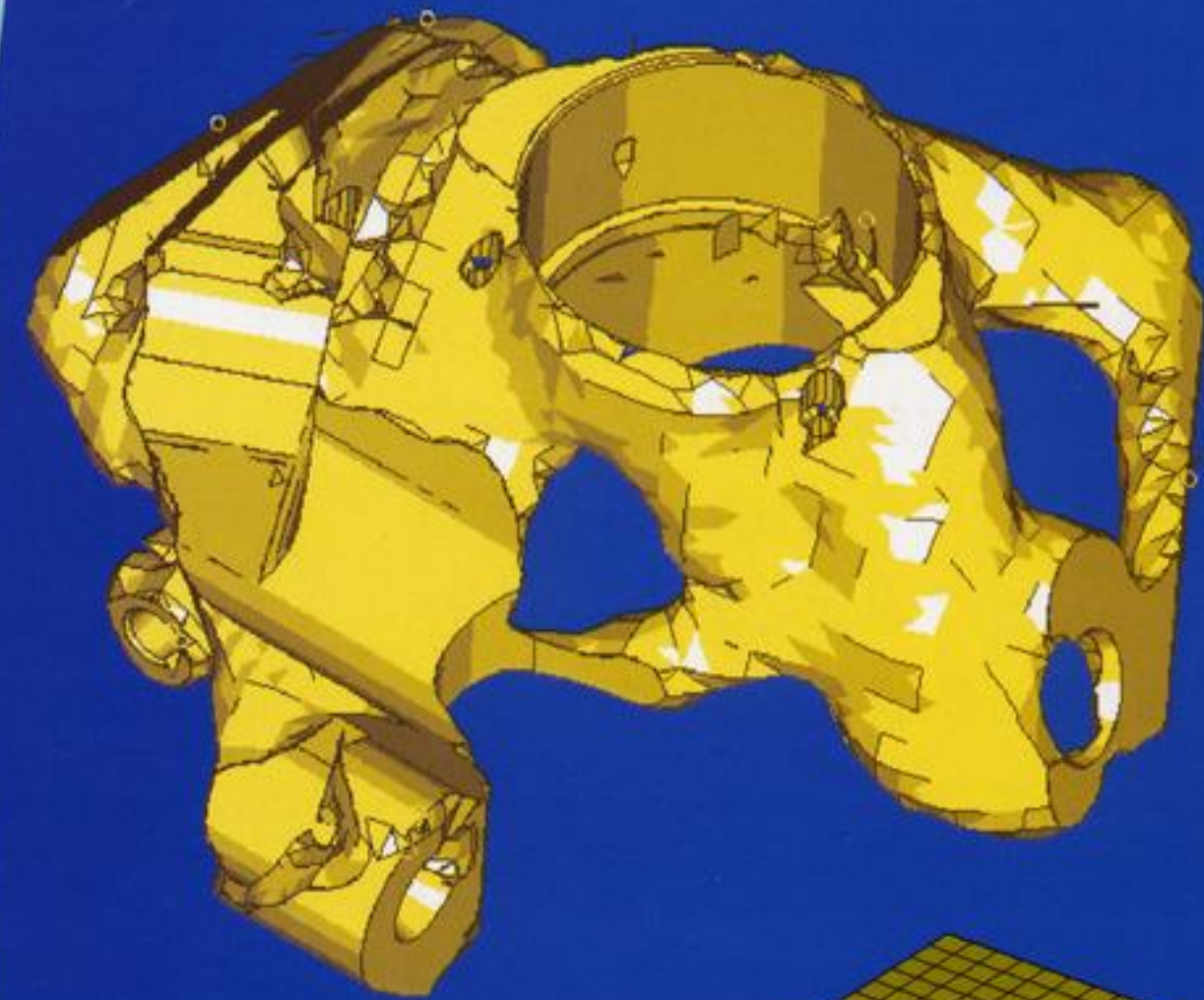


Geometry, mesh, and topology optimization of a wheel knuckle



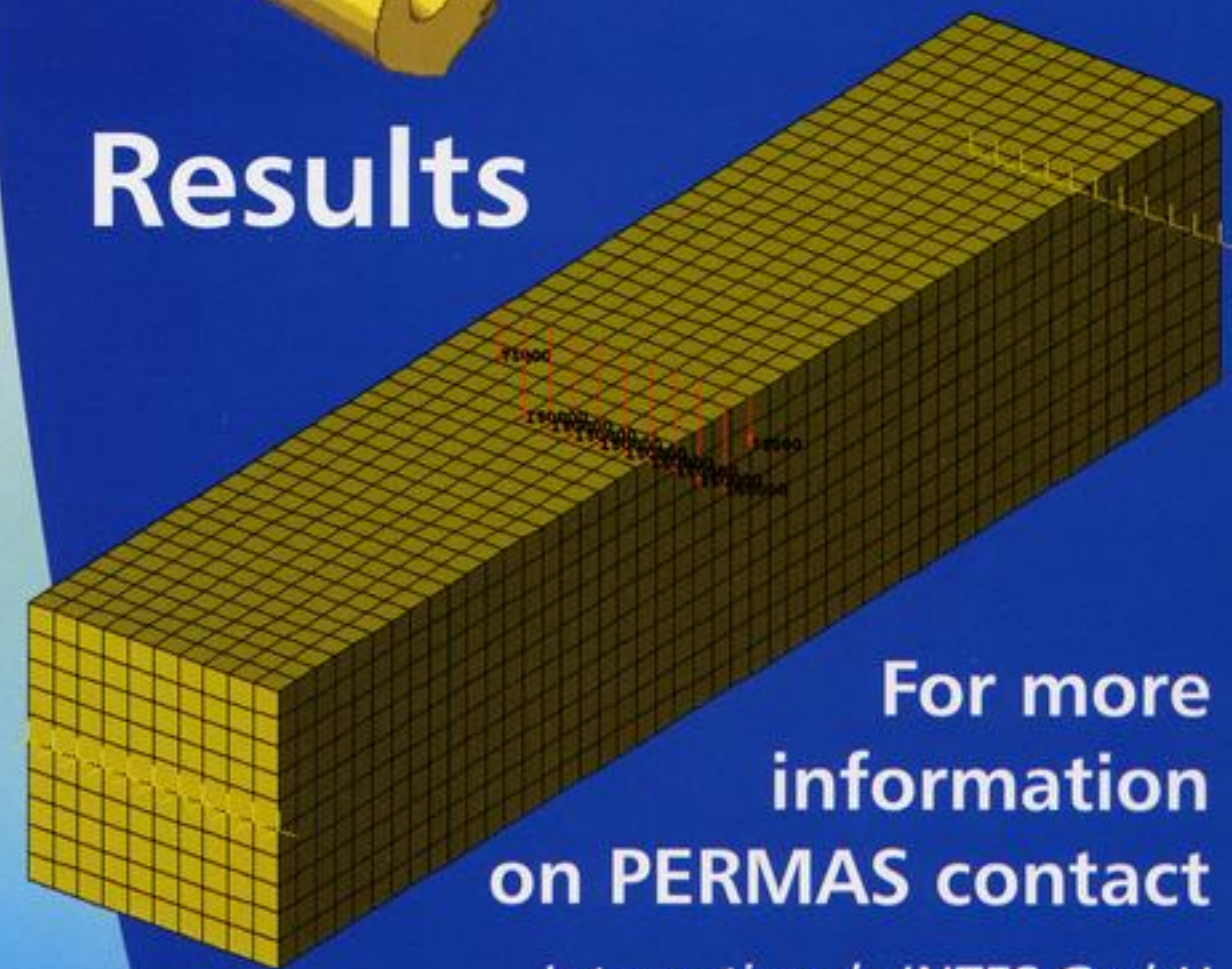
Analysis

- Linear statics and contact analysis
 - Dynamic eigenvalue analysis
- Different optimization algorithms
- Efficient integrated solution using fast algorithms and parallel execution



Results

- History of objective function
 - Element filling ratio
- Static and dynamic results
 - for all iterations



For more information on PERMAS contact

International: INTES GmbH
Schulze-Delitzsch-Str. 16
D-70565 Stuttgart
Phone +49-711-78499-0
Fax +49-711-78499-10
Email: info@intes.de
<http://www.intes.de>

In France: INTES France
35, rue des Chantiers
F-78000 Versailles
Phone +33-1-30 84 01 24
Fax +33-1-30 84 01 26
Email: permas@intes.fr
<http://www.intes.fr>

Modeling, evaluation, and topology optimization of a girder subject to bending under a centric line load using FELIX (Test example Prof. Fischer, FH Dortmund)

