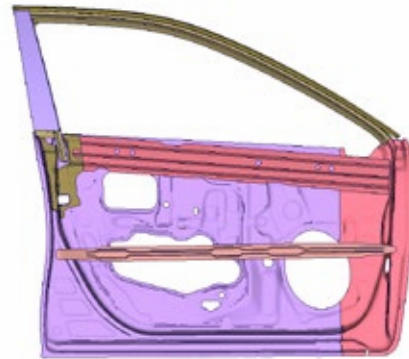


1



2

1 Visualization of the thickness differences of the two chassis.

2 Detection of multiple parts in one model which are assigned to a single part in another model.

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## ModelCompare

### FEM Model Comparison Made Fast and Easy

ModelCompare is a plug-in for finite element (FE) pre- and post-processing tools. It provides a comparison of two similarly discretized FE models and portrays their differences in terms of geometry (mesh), material identifiers (ID) and thickness.

ModelCompare identifies the differences between the two models based on the geometry described by the mesh. It uses specialized mapping techniques that result in extremely short run times.

#### User Benefits

Every organization involved in computer-aided engineering (CAE) has to deal with numerous designs that vary in geometry, material and boundary conditions.

ModelCompare is a quick-look tool capable of determining the differences between two FE models, which are discretized similarly. With ModelCompare, you can quickly compare two FE models within the visualization tool of your choice without

going through the burden of manually determining the differences.

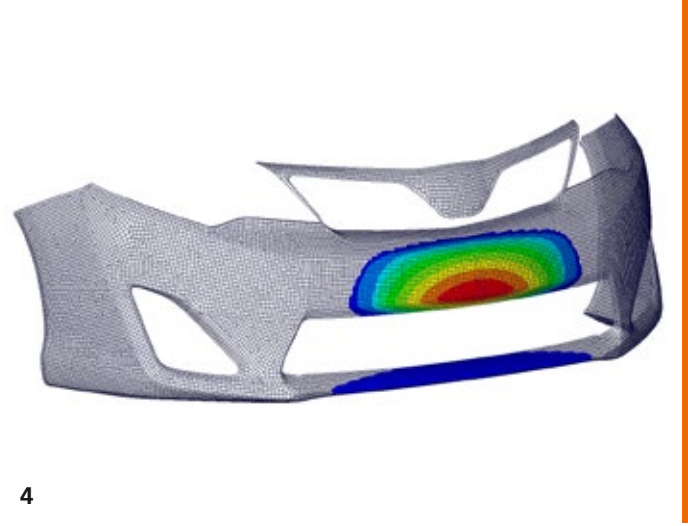
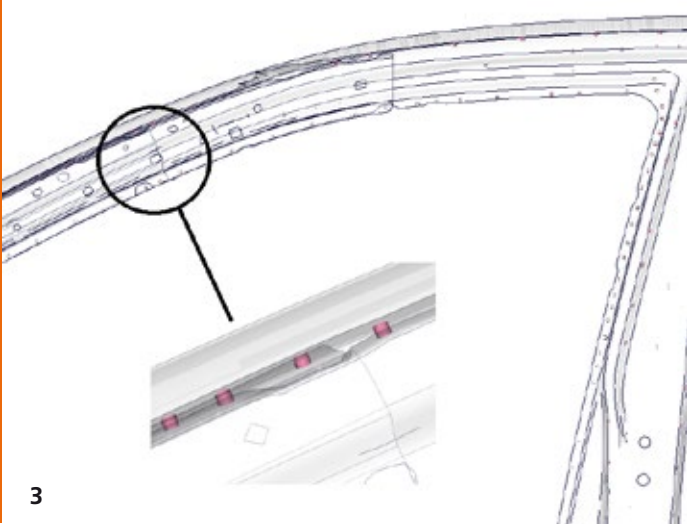
#### Our Contribution

At Fraunhofer SCAI, we thrive at the cross-roads of mathematics and data analysis. This enables us to provide cutting-edge tools that address the everyday needs of CAE engineers. They often need to compare and identify parts from different models when they analyze different simulation results. This is why we developed this tool as one step of an overall simulation data analysis workflow.

#### A Seamless Interface as a Plug-in

ModelCompare is available as a plug-in for GNS Animator and can also be provided as a seamless, versatile interface for the visualization tool of your choice or as a stand-alone tool.





3 Differences in the spotwelds have been detected and can be visualized together with the connecting parts.

4 The bumper of the car that has been morphed in the other model has been detected as changed and the color coding depicts the intensity of morphing involved.

### Geometry and Mesh Changes

An accurate estimation and depiction of the differences in geometry of two FE models is made based on their nodal positions. Additionally, parts having the same shape, but different mesh configurations, are also detected and displayed.

### Duplicated Parts in One Model

Parts with the same shape and same mesh, which occur several times in a model, are identified independently of their orientation.

### Multi-Parts Detection

A part in the first model that is split into many parts in the second model can be identified as a set consisting of these parts.

### New and Missing Parts/Elements

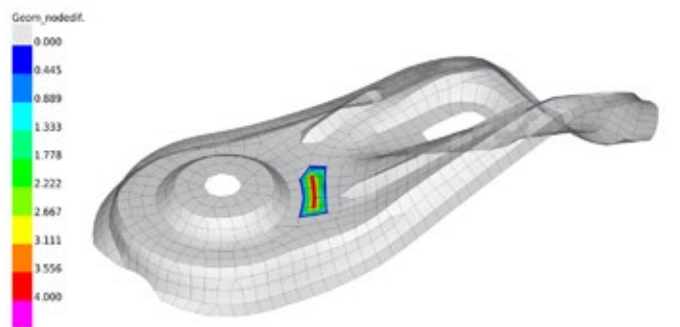
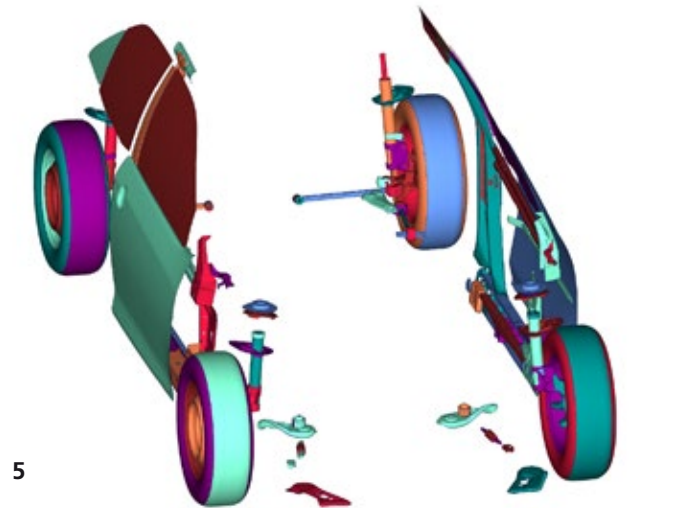
New parts that have been added to, or parts that have been removed from the model can be detected and visualized effectively. Elements removed from a part in one of the two models, e.g. due to improper meshing, can also be detected. Furthermore, the tool also detects when an element belongs to two different parts in the two models.

### Detection of Material-ID and Thickness Changes

Differences in material-ID and thickness values between both models are detected. Here, thickness changes can be part-based or element-based.

### Detection of Spotweld and RBE Changes

Differences in the attributes of the spotwelds (e.g., part identifiers, element identifiers and connected parts) along with new and missing spotwelds are identified and visualized. Additionally, differences in the positions of the master and slave nodes of the rigid body elements (RBEs) can also be determined.



5 Similar parts detected within one model.

6 Small differences in the discretization meshes of the two models are detected. The maximum distance of the displaced node positions is here about 4mm.