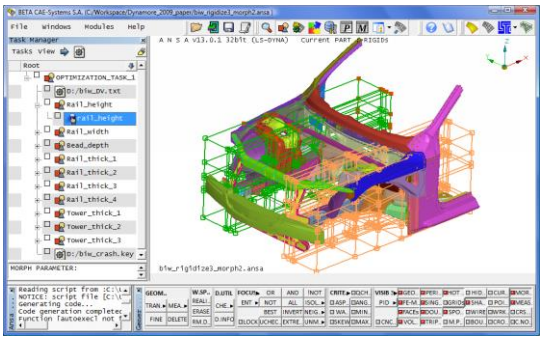
ANSA, LS-OPT, META: A complete software set for optimization

ANSA, the CAE pre-processor of BETA CAE Systems since its v12.1.3 is coupled with LS-OPT of LSTC. This highly efficient solution is already been successfully deployed in the Industry. Now, completing a full package for optimization applications, the latest release v6.4.0 of META post-processor of BETA CAE Systems provides a special User Toolbar, the *OptimizerSetup,* for the extraction of histories and responses from various solver's results. LS-OPT 4.0. of LSTC is able to control the META post-processing sequence and automatically recognize and use the histories and responses defined in META.

The ANSA *Optimization Task*

The *Optimization Task* is a special tool of ANSA that allows the user to set up the pre-processing of an optimization problem.



Simulation and animation

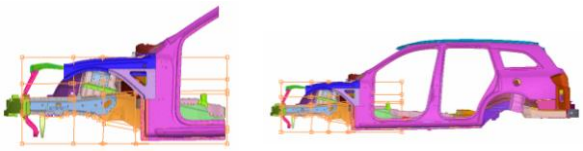
The Optimization Task provides a special tool to simulate and animate the model shape for different combinations of design variable values. Thus the user can check the model behavior before contacting the optimization with LS-OPT.

Model check and report

Full model report can be created for checking model validity. Element quality, mass report and measurements among specific positions could be extracted from the geometrical model. Moreover automatic model fixing can be performed during the optimization loops such as property thickness penetration.

Multi-disciplinary process set up

The Optimization Task is capable to handle multiple models that correspond to different analyses and load cases. Morphing is applied commonly to all models to perform identical model shape using a unique design variable file.



Coupling META to LS-OPT

META allows the extraction of responses and histories, real and complex, from data deriving from various solvers and prepares all needed files for the easy connection with LS-OPT.

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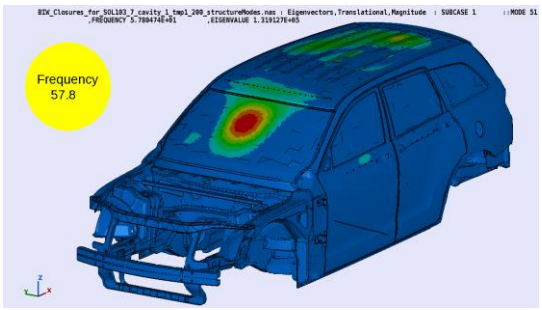
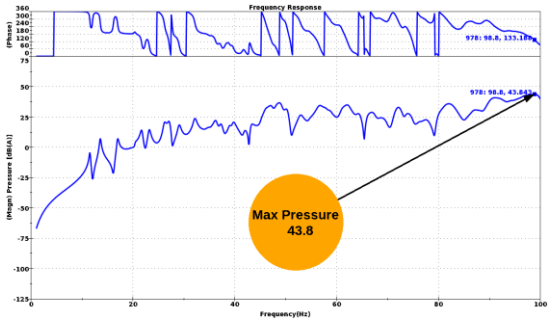
Extracting responses using Annotations



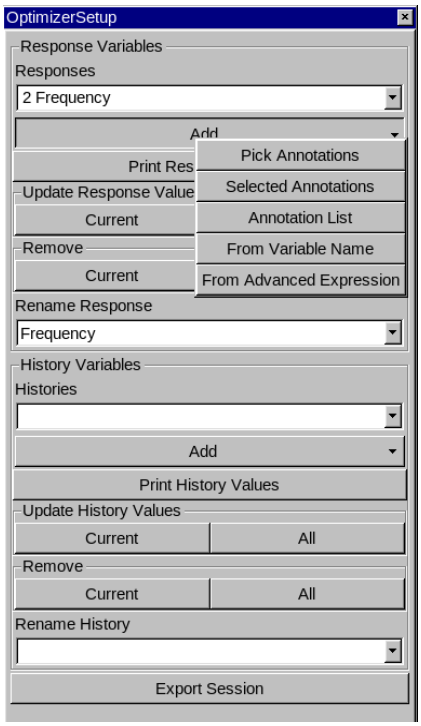
Responses can be defined using the run-time *Annotations*. This is a comprehensive tool for tracing results from the 3D models or 2D curves. Mathematical functions can also be applied to extract combined results.



Extracting histories using 2D-Plot Tool

For histories definition the 2D-Plot tool of META offers advanced functionality for handling real and complex history results such as applying filters and mathematical operations on curves, calculating Crash Analysis Criteria, associating curves with the 3D model and many more.

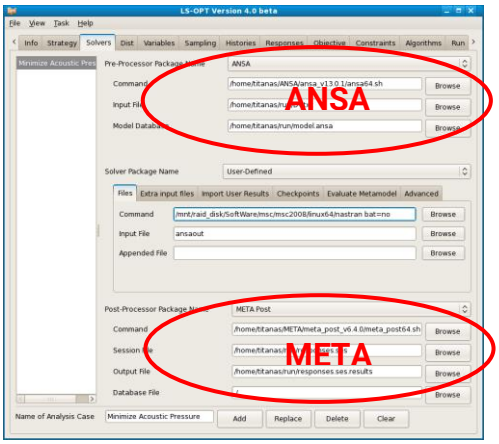
The OptimizerSetup Tool



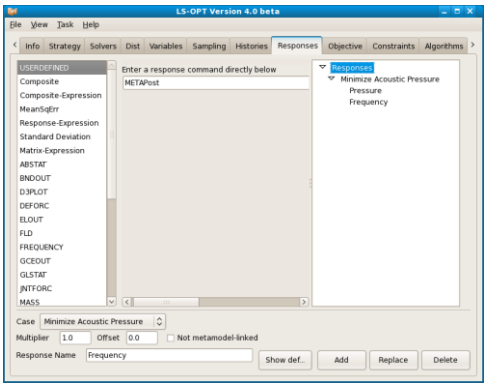
The *OptimizerSetup User Toolbar* has been developed in META for the effortless extraction of responses and histories.

Responses and histories are stored in an ASCII file with a specific and simple format which is recognized by LS-OPT. All necessary actions that the user made in META until the response definition are recorded in a session file. Using this session file, LS-OPT can reproduce the response extraction for every optimization iterations.

LS-OPT responses TAB



LS-OPT provides a direct coupling to ANSA and META without the need for any scripting or customization. At the Solver Tab of LS-OPT, the user can define the pre- and post- processing sequence that will run in batch mode for each iteration. The design variables, defined in ANSA, are imported in LS-OPT and listed at the *Variables* tab. In the same way histories and responses defined in META are recognized automatically and listed in the relative LS-OPT tabs. Hence, there is no need of redefining them in LS-OPT.



Benefits

The combined set of ANSA, LS-OPT and META offers a complete solution for optimization applications. Seamless integration of the above software provides an efficient problem set-up without the need of any scripting or customization. Since META can extract responses and histories form numerous solvers, LS-OPT becomes capable for multidisciplinary / multi solver optimization.

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