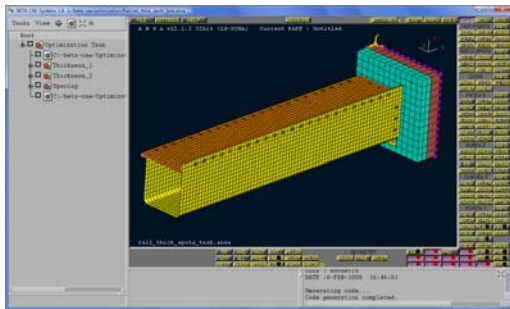


## Coupling ANSA to LS-OPT for optimization applications

ANSA of BETA CAE Systems S.A. is a complete CAE pre-processing solution, a modeling environment that meets the needs of numerous solvers. Starting with ANSA v12.1.3 powerful features for the definition of optimization scenarios are integrated. Latest ANSA releases offer the capability to set up shape, parameter, spotweld and composite optimization problems. Through a special tool, the *Optimization Task*, the user is able to prescribe the shape and parameter modifications of the model that will take place during the optimization and set up the Design Variables that will control the model.

ANSA can be directly coupled with LS-OPT 3.3. of LSTC to provide an integrated solution in the field of optimization. LS-OPT 3.3. is able to control the ANSA *Optimization Task* without the need of any scripting job. This makes the coupling of the two programs flexible and easy to use.

### The ANSA *Optimization Task*



The *Optimization Task* handles the FE-model in the many ways:

#### Shaping

The Optimization Task can control the shape of the model using the ANSA Morphing Tool. Any action for model morphing can be defined parametrically and then be driven by the Design Variables.

#### Model parameters

Design Variables that are defined in the Optimization Task are able to drive any entity or parameter of the ANSA model. Parameters like shell thickness, material properties and meshing parameters can be easily controlled by Design Variables.

#### Spotweld Optimization

The Design Variables can control the parameters of the connections in an assembly model for the definition of a spotweld optimization problem. Such parameters can be the spotweld distance, the number of the applied connections or the spotweld properties.

#### Composites optimization

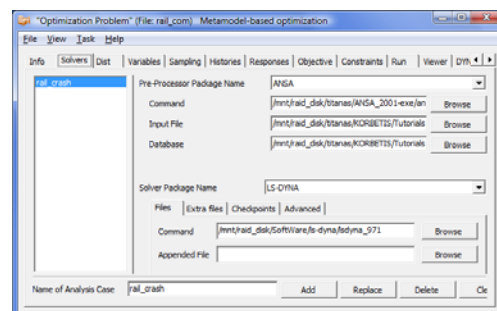
Composite material optimization is achieved through the use of the ANSA Laminate Tool. Fabric orientation layer thickness and material properties can be assigned as Design Variables.

### Coupling ANSA to LS-OPT

#### Pre-Processing

The information defined in ANSA *Optimization Task* for the Design Variables can be transferred to LS-OPT through a simple ASCII file.

LS-OPT enhance ANSA as a Pre-Processor Package in its Solver tab. Through special entries, the user can define the ANSA command, the ANSA file and the ASCII file that contains the Design Variables definition. As a result the Design Variables, their name, type and bounds are recognized automatically and listed in the relative LS-OPT tab. Hence, there is no need of redefining the Design Variables in LS-OPT.



#### Running

When the optimization process runs, LS-OPT invokes ANSA in batch mode and executes all the actions that have already been defined in the *Optimization Task*.

#### **Benefits**

Complicated tasks such as batch meshing, mesh quality improvement and model assembling can be driven by the *Optimization Task*. Furthermore, using the *ANSA Scripting Language*, in combination with the *Optimization Task*, it is possible to parameterize any ANSA operation. Consequently, the coupling of ANSA and LS-OPT not only provides a tool for typical optimization problems solving, but also is a vehicle for the improvement and the acceleration of the overall CAE process.

For more information contact us at [ansa@beta-cae.gr](mailto:ansa@beta-cae.gr)