

## COMBINING POWERFUL PARAMETRIC MODEL CAPABILITIES WITH ROBUST DESIGN OPTIMIZATION (RDO)

Computer-aided engineering (CAE) helps investigate large numbers of product variants across numerous product application scenarios. This is a key strategy to cut costs and shorten design cycles during the virtual product development process.

The combination of Ansys Workbench — providing leading technology for parametric and pervasive CAD and CAE modeling for simulation-driven product development — and Ansys optiSLang — delivering efficiency and automation of RDO methods — offer a powerful environment for virtual product optimization.

### This Brochure Contains:

The leading-edge features of Ansys optiSLang which enable you to combine powerful parametric model capabilities with robust design optimization.

You will understand why optiSLang is the ideal platform to address your future needs of parametric and simulation-driven virtual product development.

### / Leading-Edge Algorithms for RDO

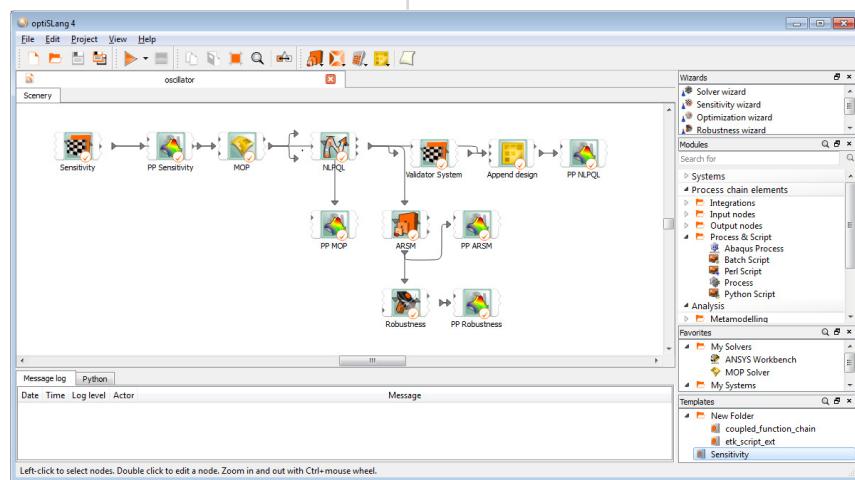
The introduction of CAE-based RDO in virtual product development places high demands on process automation, parametric virtual models and algorithmic efficiency. Since optiSLang's launch in 2001 its technology continues to evolve, primarily supporting applications with complex non-linear analysis models including many parameters and stochastic variables. optiSLang also robustly handles design failures and CAE solver noise. Enabling modular workflows, optiSLang is a flexible and user-friendly software tool for CAE-based product optimization. Leveraging optiSLang and the metamodel of optimal prognosis (MOP) methodology, you can contain automatic variable reduction, measure forecast quality of response variations and efficiently solve challenging RDO tasks.

### / CAE Integration and Process Automation

ANSYS Workbench helps you create powerful parametric modeling to satisfy key RDO requirements, includes bidirectional interfaces to major CAD programs and imports CAE and CAD data into a central parameter manager. Workbench's system integration, process automation and job control helps update the designs. optiSLang's process automation is enabled by direct integration with parametric modeling environments and external CAE

codes. Simplified optimization and robustness evaluation is enabled when all parameters are available in Workbench, optiSLang and sensitivity analysis modules. This effectively eliminates the challenge of setting up and running variation analyses.

If additional input or output parameters must be added, signals must be processed, or third-party tools must be integrated, optiSLang's GUI delivers powerful integration and automation capabilities. To integrate Workbench projects, an Ansys integration node and a text file base communication functionality is available. optiSLang's graphical programming also supports file-based process integration and direct access to parametric modeling CAE environments from Ansys or SimulationX and other environments including Excel, MATLAB and Python.



## / CAx Workflows and Simulation Process and Data Management

optiSLang provides various features for efficient parametric modeling and process generation. This includes the definition and use of templates or sub-flows as well as the customization of user-defined algorithms and workflows. Since optiSLang version 5, gateways to simulation process and data management (SPDM) have been implemented for the definition and usage of SPDM parametric models and the data exchange with Ansys EKM or Siemens Teamcenter.

## / Best Practice Modules

optiSLang provides industry-leading algorithms equipped with default and wizard guidance for regular integration of CAE-based RDO methodology in virtual product development. optiSLang's algorithms and modular workflow generation are supported by three modules:

1. Sensitivity analysis helps you understand the design, focus on key parameters, check your response variation's forecast quality and automatically generate your optimum metamodel.
2. Optimization helps improve your design performance.
3. Robustness evaluation helps you verify the design robustness regarding scattering material parameters, production tolerances and varying environmental conditions.

The modules can be easily applied with optiSLang's drag and drop functionality. Using wizard-based setup, your input is reduced to a minimum, requiring only the setting of parameter ranges, scatter, constraints and objectives. All algorithm settings are automatically generated with the help of best practice defaults and a wizard-guided modular workflow. Within the optimization module, algorithms generate the most efficient and fitting optimization strategy based on the results of a sensitivity analysis and additional user input.

## / Extensibility

optiSLang's open architecture enables you to incorporate:

- Algorithms for DOE, optimization, robustness, etc.
- Metamodels
- Tool integrations
- Database connections

Flexibility requirements for upcoming extensibility requests are satisfied by those interfaces. optiSLang is the ideal platform to address your future needs of parametric and simulation-driven virtual product development.

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