optiSLang

CONNECT

Combining Design and Simulation Tools to Automate Multiphysics Workflows and Optimize Complex Designs

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

Ansys optiSLang® software is an automation framework used for parametric design exploration and optimization in conjunction with physics-based simulations.

In This Brochure:

Discover the leading-edge features of optiSLang software, which enable you to combine powerful parametric modeling capabilities with robust design optimization.

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

Leading-Edge Algorithms for Process Integration and Design Optimization

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

If customers need to combine algorithms with solvers, they have two possibilities with optiSLang software:

1. **Directly integrate optiSLang software into Ansys tools.** optiSLang software comes packed with new capabilities that increase engineering productivity, including one-click optimization and accelerated efficiency with 98% faster designs. The benefits of integrating optiSLang software into the UI/UX of another tool include a seamless user experience, streamlined workflows, and enhanced productivity.
2. **Use optiSLang software as a standalone solution.** When you want to do more, you can click on the “Go To” button to use optiSLang software by itself and benefit from its full capabilities, including advanced workflows, third-party tool integration, and the ability to publish optiSLang apps to Ansys Minerva software and other model-based systems engineering (MBSE) tools. Additionally, using the optiSLang AI+ add-on provides extended AI capabilities, including automatic creation of the best metamodels with AI-enhanced algorithms and the ability to “bring your own AI.”

CAE Integration and Process Automation

Ansys' flagships solvers help you create powerful parametric models to satisfy key design optimization requirements. This includes bidirectional interfaces to major computer-aided design (CAD) programs and importing CAE and CAD data into a central parameter manager. The Ansys Workbench platform's system integration, process automation, and job control features help update the designs. optiSLang software's process automation is enabled by direct integration with parametric modeling environments and external CAE codes. When all parameters are available in Workbench software, optiSLang software, and sensitivity analysis modules, you can achieve simplified optimization and robustness evaluation. 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 software's graphical user interface (GUI) delivers powerful integration and automation capabilities. To integrate Workbench projects, an Ansys integration node and text file base communication functionality is available. optiSLang software's graphical programming also supports file-based process integration and direct access to parametric modeling CAE environments from Ansys, as well as those from Microsoft Excel and Python. Thanks to our open ecosystem, you can connect to 100+ third-party CAE/CAD applications in daily use and numerous in-house solutions.

CAx Workflows and Simulation Process and Data Management

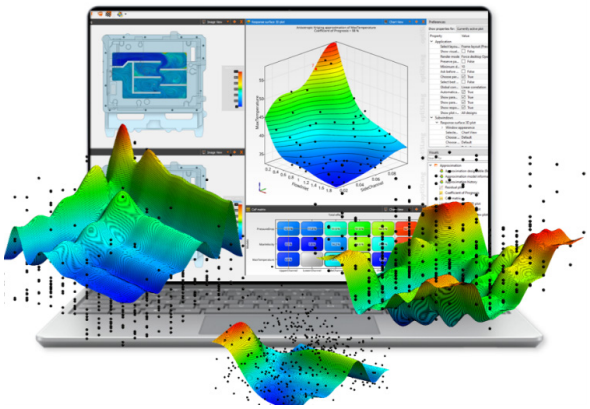
optiSLang software provides many features for efficient parametric modeling and process generation. This includes the definition and use of templates or subflows, as well as the customization of user-defined algorithms and workflows. Since version 5 of optiSLang software, gateways to simulation process and data management (SPDM) have been implemented for the definition and usage of SPDM parametric models and the data exchange with programs such as Minerva software.

Best-Practice Modules

optiSLang software provides industry-leading algorithms equipped with default and wizard guidance for regular integration of CAE-based Robust Design Optimization (RDO) methodology in virtual product development. optiSLang software'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 and reliability analysis helps you verify the design's robustness regarding scattering material parameters, production tolerances, and varying environmental conditions.

The modules can be easily applied and combined with optiSLang software's drag-and-drop functionality. Using a wizard-based setup process, your input is reduced to a minimum, requiring you to only set parameter ranges, scattering parameters, 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.



Openness

optiSLang software's open architecture enables you to incorporate your:

- Algorithms for design of experiments (DOE), optimization, robustness, etc.
- Metamodels
- Tool integrations
- Database connections

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

/ Customer Testimonials

"The advanced reliability methods available in Ansys optiSLang software enable Mercedes-Benz AG to make a safety statement for Level 3 ADAS (advanced driver-assistance systems) using scenario-based simulation. Thanks to the efficient and robust methods, the number of necessary traffic simulations could be dramatically reduced in comparison to Monte Carlo sampling. The Ansys optiSLang post-processing, with which detailed analyses of the results could be carried out, should also be emphasized."

Maximilian Rasch & Zafer Kayatas, ADAS Validation Engineers / **Mercedes-Benz AG** (Ansys Case Study)

"Simulation democratization, digital thread, optimization, and machine learning are shaping the modern product development process at MANN+HUMMEL. Ansys' expanded AI offerings, like Ansys optiSLang AI+ [add-on], allowed our team to perform a design of experiment on a parametrized model of air filter properties, which we used to run an AI-based optimization strategy. In doing so, we reduced our simulation effort significantly, which will help us bring smart and sustainable technologies to get to the market faster."

Dr. Florian Keller, Director, Engineering, Air Filter Elements & Simulation / **MANN+HUMMEL** ("Ansys Continues AI Innovations")

/ Extra Links

- Start your 30-day free trial of optiSLang software
  http://www.ansys.com/products/connect/ansys-optislang/optislang-trial
- Explore optimization in optiSLang software with Ansys Innovation Courses
  https://innovationspace.ansys.com/courses/optimization/
- Visit the Ansys Learning Hub to learn how to use optiSLang software to meet your goals (require Ansys ID Single-Sign-On)
  https://learninghub.ansys.com/pages/74/ansys-optislang

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