

PowerFLOW Optimization Solution

Exa's PowerFLOW Optimization Solution helps manufacturers meet design targets by finding their optimal design through automated, targeted simulation.

The PowerFLOW Optimization Solution allows customers to:

FIND DESIGN IMPROVEMENTS

Without exploring the entire design space, some design improvement options may never be explored

REDUCE SETUP TIME

Optimization projects can be easily setup with fully integrated and easy-to-use tools and simulation workflow configuration

ELIMINATE COSTLY HUMAN ERRORS

Fully automated simulation process speeds project execution and avoids human mistakes

STUDIO QUALITY SURFACE MODIFICATION

Design department, high quality surface data is suitable/accepted in the studio

COMPETING IN A WORLD OF OPTIONS

Engineering new vehicles today is a far cry from engineering demands even of the last decade. Manufacturers are expected to release models faster than ever before, with more options and increasing government and consumer pressure for economy and efficiency.

Challenges facing transportation manufacturers as they try to meet performance targets:

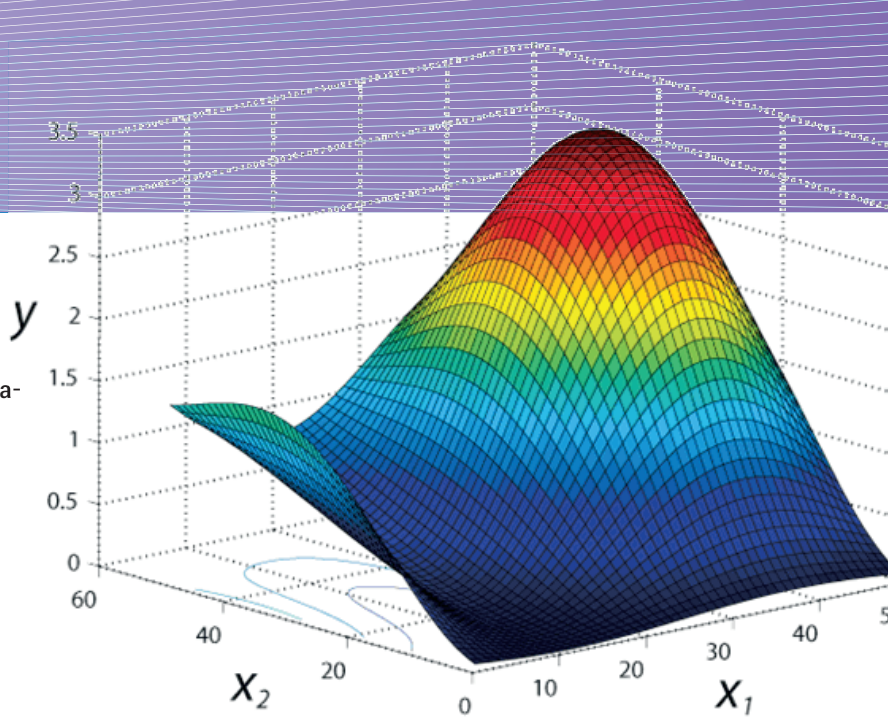
- *Model Proliferation: in the passenger vehicle industry model proliferation is staggering; with a 40 % increase in the number of models produced in the last 15 years*
- *Design Aesthetics: consumers demand aesthetically pleasing products and numerous model options, yet engineering department sizes have remained constant |*
- *Increased Costs for Small Gains: Costs to incrementally improve performance are increasing as even small gains become more challenging to achieve*
- *Regulatory Pressures: fuel economy and CO2 emissions are advancing performance targets and also making goals more difficult to reach with evolving test procedures involving real world conditions*

OUR OPTIMIZATION SOLUTION

Exa's PowerFLOW optimization solution combines statistical analysis with the ability to simulate some of the world's most complex fluid flow problems. A fully automated optimization process uses statistical analysis methods to systematically explore the potential of design alternatives based on results from PowerFLOW simulations, capable of accurately predicting real-world flow conditions without compromising geometric detail. Plug-in integrations with the market-leading optimization analysis tools, modeFRONTIER and Isight, enable easy setup and automated execution of simulations. These tools offer a mathematical "response surface" generated from a small number of simulations, and advanced algorithms to identify trends and evaluate trade-offs providing a multi-dimensional analysis beyond the capability human reasoning. Our high performance visual flow analysis tools are then used to understand and explain the trends seen in the statistical analysis.

Summary of Capabilities:

- Fully integrated modeFRONTIER and Isight plug-ins
- Fully automated simulation process execution
- Easy-to-use, interactive, design space setup
- Studio-quality, parametric surface morphing
- Best-in-class multi-dimensional statistical analysis using modeFrontier or Isight
- Proven, documented optimization methodology and best practices



Finding your optimal design used to be an expensive and labor intensive process which is now automated using the PowerFLOW Optimization Solution

WHY CHOOSE OPTIMIZATION?

Reduce your project set up time...

- Work with fully integrated, easy-to-use setup tools and simulation workflow configuration
- Access fully-integrated plug-ins to modeFRONTIER or Isight with a simple interface for set up and execution
- Through easy-to-use Design and Response Variable tables in PowerDELTA, PowerCASE, and PowerINSIGHT, the user can define the optimization project while setting up the baseline simulation

Reduce project execution time and eliminate costly human errors.

Fully automated simulation process execution enables:

- Automatic execution of workflow for each simulation
- Automatic geometry modification and simulation case set up
- Automatic simulation results collection

Ensure that results of the optimization process will be acceptable to design

- Studio-quality surface modification
- Infinitely vary surfaces using patented, parametric, lattice morphing technique

Multi-attribute, cross-discipline optimization allows engineering departments to collaborate. (For example: a cooling packages can be optimized for both cooling performance and cooling drag impact)

- Simultaneously achieve improvements on fuel economy and top tank temperature
- Project successes show up to 5% improvement on fuel economy along with 10% increase in mass flow rate

HOW IT WORKS...

1

Set up design variables

In Exa PowerDELTA and PowerCASE, users can set design variables such as morphing features and boundary conditions; define response variables in PowerINSIGHT

2

Use wizard to establish workflow

Click through the easy setup wizard in ESTECO modeFRONTIER® or Dassault Systemes Isight to automatically queue up your optimization workflow

3

Execute your project

Built in algorithms for the response surface are ready for you based on optimization in modeFRONTIER or Isight

4

Perform statistical analysis

Extract trends from the data and compare with visualization content from PowerVIZ and PowerINSIGHT created automatically for each simulation

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