Probabilistic Simulation and Optimization with FEMM-Models

On http://www.optiyummy.de/index.php/Software:_FEM_-_FEMM examples are given for using the optimization tool OptiY coupled with FEMM models. A free OptiY "Student Edition" can be downloaded from http://www.optiy.de.

OptiY is a multidisciplinary analysis and optimization program providing most modern optimization strategies and state of the art probabilistic algorithms for uncertainty, reliability, robustness, sensitivity analysis and approximation. Optimization models can be considered as black box with input and output variables. Within, it is an open platform for different kind of model classes. The adaptation to a special simulation environment takes place by a suitable interface. Collaborating different simulation systems is possible as networks, finite-element-method (e.g. FEMM), rigid body dynamics, also material test bench as control optimization for drives:

Stochastic Distributions

- Normal Distribution
- Uniform Distribution
- Generalized Lambda Distribution
- Fitting of any Distribution via statistical Moments or Excel-Data

Optimization Methods

- Hierarchical Optimization
- Weighted Optimization
- Penalty Method
- Hooke-Jeeves
- Grid-Search
- Evolution Strategies
- Pareto Strength Evolutionary Algorithm
- Optimzation with Surrogate Model

Design of Experiment

- Full Factorial Design
- Monte-Carlo-Sampling
- Latin-Hypercube-Sampling
- Sobol-Sampling
- Response Surface
- First Order Moment Method (Interaction, Non-interaction)
- Second Order Moment Method (Interaction, Non-interaction)
- Subset-Simulation

Approximation Methods

- Taylor-series with any order

- Least Square
- Partial Derivatives

Editors

- Script-Editor for Edit, Test and Debug of VBScript and JScript
- Workflow-Editor
- Nominal-Editor
- Stochastic-Editor
- Constraints-Editor
- Criteria-Editor

Postprocessing

- Values-Tables
- 1D-Diagram
- 2D-Diagram
- 3D-Diagram
- Parallel Chart
- Set-Select (Optimization, Pareto-optimal, filtered Pareto-optimal)
- Bestvalue (Simulation, Show)
- 2D-Scatter-Plots
- 3D-Scatter-Plots
- Section Diagram
- 3D-Response Surface
- Coefficient Chart
- Residual-Plots
- Histogram
- Correlation Matrix
- Probability Density
- Comulative Distribution
- Sensitivity Chart

Interfaces

- Generic ASCII-File-Interface (DOS-Batch, VBScript, JScript)
- Generic COM-Interface (VBScript, JScript)
- Matlab/Simulink
- SimulationX
- CST Studio Suite
- Excel

Report

- Automatic Report in Word

Export

- Data-Export in Excel
- Graphics-Export in BMP, JPEG, TIF und PNG-Format

- Export of surrogate model in C or Matlab

Requirement

- PC with min. 1GHz Processor und 500 MB RAM
- OpenGL 3D Graphics Card
- Windows XP or Higher
- MS Office 2002 or Higher