

LS-OPT Version 4.0 and 4.1 - Overview

(Excerpt from the LS-OPT 4.1 manual preface)

The development of LS-OPT has continued with an emphasis on the integration with LS-DYNA and LSPREPOST. The main focus of Version 4 has been the development of a new graphical postprocessor. The following features have been added:

Version 4.0:

1. The Viewer has been redesigned completely to accommodate a multi-window format using a splitwindow and detachable window feature.
2. The Correlation matrix for simulation variables and results has been added.
3. For visualizing the Pareto Optimal Frontier, Hyper-Radial Visualization and Parallel Coordinate plots have been added to the more traditional scatter plot. Multiple points can be selected to create a table of response values. Point highlighting is cross-connected between plot types.
4. An interface for the METAPost postprocessor has been added.
5. Topology optimization LS-OPT®/Topology has been added as a separate module. Please refer to the LS-OPT/Topology User's Manual.
6. Many of the features such as the Reliability-Based Design Optimization have been significantly accelerated.
7. The Blackbox queuing system has been streamlined in terms of providing better diagnostics and a special queuing system Honda has been added.
8. The NASTRAN® interface for frequency extraction and mode tracking has been added.

Version 4.1:

1. Discrete sampling can be done on a variable by variable basis for most sampling schemes including D-Optimality, Space Filling and Full Factorial.
2. The Space Filling algorithm has been improved for accuracy and speed.
3. Job scheduling has been significantly improved. Environment variables can be exported through queuing systems.
4. Job data is displayed on the run progress bars with a selection to view the solver log file at any stage of the run.
5. Three injury criteria: a3ms, Chest Compression and Viscous Criterion have been added.
6. SPH, DBBEMAC and NODFOR groups have been added to the LS-DYNA response interface.
7. GenEx, the LS-OPT Generic Extractor provides features for extracting entities from text files. This allows LS-OPT to be used with any solver code that produces a text database.
8. Responses can be linked to LS-DYNA cases (*CASE keyword).

9. In addition to polynomials, Radial Basis Functions can now be used for parameter identification.
10. The following features have been added to the Viewer: Self-Organizing Maps (for multi-objective optimization), two-dimensional interpolation matrix using metamodels, global sensitivities (Sobol), Computed (simulation) and Predicted (metamodel) histories, Parallel Coordinate plot for simulation results.
11. Experiments can be replicated for stochastic fields. Improvements have been made to Stochastic Fields (*PERTURBATION) in LS-DYNA. Special coordinate systems have been added.
*PERTURBATION_MATERIAL has been added for MAT24.
12. To avoid synchronization errors, the Experiments and AnalysisResults databases have been converted to self-contained .csv files.
13. The Run page has been rationalized. Clean start options are now available for all tasks.
14. A selected subset of Pareto optimal points can be exported to a standard format. The file can be used to schedule the points as simulations.

The automotive and other industries have again made significant contributions to the development of new features in LS-OPT. In addition to long-time participant Professor Larsgunnar Nilsson (Mechanical Engineering Department, Linköping University, Sweden), Dr. Daniel Hilding, Mr. David Björkevik and Mr. Christoffer Belestam of Engineering Research AB (Linköping) as well as Dr.-Ing. Heiner Müllerschön, Dipl.-Ing. Marko Thiele and Dipl.-Math. Katharina Witowski of DYNAmore GmbH, Stuttgart, Germany have made major contributions as developers. Dr. Trent Eggleston has made vast improvements to solver job scheduling via queuing systems.

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