

## **New Software: Product Description**

### **By Multistat**

Key part of Multistat Optimizer is Method of Visualization for Multidimensional Models by Projections (VMFP), ([www.multistat.com](http://www.multistat.com)) which has been patented in 2002 (U.S. patent # 6,417,852.) VMFP also can be considered as a method of multi-objective optimization and graphical analysis for high-dimensional functions.

There is a fundamental difference between VMFP and conventional methods of Multidisciplinary and Structural Optimization: VMFP method substitutes model by a multidimensional dataset, and then works just with the dataset.

On the first step model values are calculated on the points of a Uniformly Distributed Sequence (UDS) that have special properties (see details on [www.multistat.com](http://www.multistat.com).) Generated multidimensional dataset is an approximation of the model with predetermined accuracy.

On the second step the dataset is visualized in the interactive mode by using widely known visualization techniques for multidimensional datasets. UDS uniformly covers the entire domain. So, if the dataset is split into differently colored subsets by a split-criterion then hidden things become visible: Pareto-set, set of feasible solutions, contour diagrams, etc.

See a paper dedicated to solving Structural Optimization task by VMFP method, and published on the Second MIT Conference on Computational Fluid and Solid Mechanics:

<http://www.multistat.com/download/MITConf2003Paper.pdf>

In addition to interactive visualization tools, Multistat Optimizer provides the following features:

- Two methods of multi-objective optimization
- Built-in experimental design tool
- Effective global approximation methods those allow for substituting time-consuming finite elements models by corresponding Neural Networks or polynomial models
- Integration with any models developed in MATLAB
- Easy integration with NASTRAN, ADAMS and other scientific software packages
- Integrated development environment

Multistat Optimizer is the only truly multi-objective commercial product on the market that does not use the weighted sum of a set of objectives. It optimizes many objectives simultaneously, and allows user to pick the best design later on from a set of optimal designs for various trade-offs.

VMFP and similar UDS based methods were successfully used by different companies for solving optimization problems in aerospace, defense, automotive industries, financial services, structural optimization, materials science. Click here to see list of references and successful applications:

[http://www.multistat.com/download/VMFP&PSI\\_Methods.pdf](http://www.multistat.com/download/VMFP&PSI_Methods.pdf)

Multistat Optimizer is not only a powerful instrument for scientists and engineers but also an excellent tool for classroom use.