Interactive multiobjective optimization system

IND-NIMBUS®

available for academic purposes and can be purchased for non-academic applications http://ind-nimbus.it.jyu.fi/

The IND-NIMBUS[®] software

The IND-NIMBUS[®] software supports decision making in nonlinear multiobjective optimization problems. It contains in the same platform the interactive methods NIMBUS, Pareto Navigator and the approximation method PAINT. Interactive methods enable the user to learn about the problem and gain new insight.

Solves problems with

- several conflicting objectives to be minimized or maximized
- equality and inequality constraints
- nonlinear and nonconvex functions
- real- and integer-valued variables
- local and global Pareto optima

Examples of applications

- Wastewater treatment plant design
- Radiotherapy treatment planning
- Chemical process design
- Optimal shape design
- Heat exchanger network synthesis
- Continuous casting of steel
- Integrated design and control of production plants

Features

- Available for different operating systems
- Connectable for modelling and simulation tools, like
- Matlab[®], GAMS and APROS[®]

Demo version available at http://ind-nimbus.it.jyu.fi/ Academic version available on request





NIMBUS is a multiobjective optimization method based on classification of objectives

- User studies different Pareto optimal solutions where improvement in any objective is impossible without impairment in some other(s)
- User can indicate which objectives need to be improved and which can be impaired to gain more desirable Pareto optimal solutions



• User can learn about the interdependencies among the objectives

Pareto Navigator is a learning-based method for computationally expensive problems

- User moves on a convex hull of pre-computed Pareto optimal solutions by giving desired values for the convex objectives
- User sees continuous change in the values of objectives



• Enables quick computation

Approximation method PAINT based on pre-computed Pareto optimal solutions

- Applicable for even nonconvex problems
- Provides a computationally inexpensive surrogate problem
- Enables decision making with most interactive multiobjective optimization methods without waiting times for the user

Free WWW-NIMBUS for academic use http://nimbus.it.jyu.fi/

- Interactive and graphical decision support
- Enables saving user's problem settings (personal username and password)
- Operates via the Internet, no software to be downloaded: only a browser and a connection to the Internet required
- Always the latest version in use
- Server computer at the University of Jyväskylä

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Further information and some applications

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