

Lectures at Summer School on Operational Research and Applications

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Simplicial Global Optimization

Global optimization aims at minimization of a nonlinear objective function of continuous variables when no assumptions on unimodality are included into formulation of the problem – many local minima may exist. In this talk we consider deterministic covering methods partitioning feasible region by simplices. Although rectangular partitions are used most often in global optimization, simplicial covering has several advantages discussed in this talk. Applications benefiting from simplicial partitioning are examined in detail: nonlinear least squares regression and pile placement in grillage-type foundations.

Optimization-Based Visualization of Multidimensional Data

Multidimensional data visualization enables exploratory data analysis involving heuristic abilities of human experts. In this talk we consider one of the most popular approaches known as multidimensional scaling. An essential part of this technique is optimization of a function possessing many optimization adverse properties. By means of multidimensional scaling a set of objects can be represented as a set of points in a low-dimensional space, and exposed in this way to a human expert for heuristic analysis. Application areas of multidimensional scaling vary from psychometrics and market analysis to mobile communications and pharmacology.