Optimization: insights and economic applications

Brinkhuis J. (Rotterdam, Netherlands)

Prof. Tikhomirov and the speaker have been taking a fresh look at finite dimensional optimization in the context of a book-writing project. A selection from the following topics will be presented:

Insights 1. All optimization problems that can be solved analytically, can be solved in a standard way, using one and the same method. Thus art is turned into craft. This will be illustrated by means of very easy proofs of the following standard facts: the fundamental theorem of algebra, the main theorem on symmetric matrices, the implicit function theorem, the separation theorems for convex sets. Note that these facts seem to have no relation to optimization at first sight.

2. The important but seemingly complicated theory of self-concordant barriers can be based on one simple idea: restriction to a line and repeated integration of differential inequalities.

Applications

1. Why you should not sell your house to the highest bidder. (Auction theory).

2. What is a fair outcome of a bargaining opportunity? (Nash bargaining).

3. How to predict flows of cargo. (RAS-method).

4. Why should central banks be independent of governments? (Value of commitment; Nobel prize Economics 2004).