

io-port 03850830**Nesterov, Yu.E.****A method of solving a convex programming problem with convergence rate $0(1/k^2)$.**

Sov. Math., Dokl. 27, 372-376 (1983); translation from Dokl. Akad. Nauk SSSR 269, 543-547 (1983).

This interesting note suggests a method for solving a convex programming problem in Hilbert space. It requires the object-function to be convex of class $C^{1,1}$, i.e. differentiable such that the gradient satisfies a global Lipschitz condition. The estimate of the convergence rate is $0(1/k^2)$ and it cannot be improved for the class of problems considered. The algorithm uses at each step a one dimensional search involving the function and its gradient similar to Goldstein-Armijo's algorithm. It is proved that the algorithm converges and an estimate of the accuracy is given. Also an estimate of the number of evaluations of the objective function and its gradient in order to obtain a given accuracy is obtained. Finally the author suggests a similar method of solving constrained minimization problems of the type $\min\{F(f, x) | x \in Q\}$ when Q is a closed convex set in the Hilbert space E , f is a continuously differentiable function on E with values in \mathbb{R}^m with convex coordinate functions and F is a real convex positive homogeneous function on \mathbb{R}^m . *T.B.Andersen*

Keywords: estimation; differentiable objective function; convex programming in Hilbert space; global Lipschitz condition; convergence rate; constrained minimization