

**NUMERICAL ABSOLUTE DEVIATION APPROXIMATION AND  
UNIFORM APPROXIMATION BY USING METHODS OF  
CONVEX SEPARABLE UNCONSTRAINED  
NONDIFFERENTIABLE OPTIMIZATION**

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**Abstract**

In this paper, we consider the data fitting problem, that is, the problem of approximating a function of several variables, given by tabulated data, and the corresponding problem for inconsistent systems of linear algebraic equations. A traditional approach for solving these two problems is the least squares data fitting, which is based on discrete  $\ell_2$ -norm. An alternative approach is proposed in this paper: with each of these problems, we associate a nondifferentiable (nonsmooth) unconstrained minimization problem with an objective function, based on discrete  $\ell_1$ - and/or  $\ell_\infty$ -norm, respectively; that is, we use these two norms as proximity criteria. In other words, we solve the problems under consideration by minimizing the residual using these two norms. A subgradient method is used for solving these two problems, and respective subgradients are calculated. The emphasis is on implementation of the proposed approach. Some computational results, obtained by an appropriate iterative method, are given at the end of the paper. These results are compared with the results, obtained by the iterative gradient method for the corresponding “differentiable” least squares problems, that is, approximation problems based on discrete  $\ell_2$ -norm.

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