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Iterative methods for solving constrained and unconstrained optimization problems

Shokoofeh Ebrahimi*

Abstract

In this research, we study iterative methods for solving both constrained and unconstrained optimization problems. We first propose an inexact proximal point algorithm with non-summable errors for solving constrained optimization problems and show that the generated sequence converges weakly to a solution of the problem. Then, by modifying the algorithm, we propose a regularized inexact proximal point algorithm to approximate solutions of unconstrained optimization problems. In particular, we prove that the generated sequence converges strongly to common solutions of minimization problems and fixed point problems. We also present several examples to illustrate the applications of our results. Finally, we provide some numerical experiments to confirm the results.

Keywords: Constrained optimization problem, non-summable errors, proximal point algorithm, strong convergence, unconstrained optimization problem, weak convergence.

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*Department of Mathematics, Mahs.C., Islamic Azad University, Mahshahr, Iran (sebrahimi79@iau.ac.ir).