

A Simultaneous Quasi-Subgradient Method for Minimizing Convex Function with Quasi-Convex Functional Constraints

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ABSTRACT

In this work, we consider a convex minimization problem over the intersection of a compact convex simple set and a finite intersection of sublevel sets of quasi-convex functions. We propose the quasi-subgradient type method which separately deals with the objective function and a simple constrained set through a subgradient projection scheme and then performs parallel feasibility updates of constrained functions via a quasi-subgradient scheme with the appropriate weight function. This strategy provides a straightforward computation since we need not solve a subproblem to determine the metric projection onto the whole constrained set. Focusing on the convergence results, we prove subsequence convergence to the optimal solution of the considered problem and also establish the convergence rate for functional value to the optimal value. Additionally, by imposing the Hölder error bound property, we prove the convergence of the whole sequences to the optimal solution. We finally perform a numerical example to demonstrate the convergence behaviors of the proposed method for various choices of relating parameters and weight functions.

KEYWORDS: Nonsmooth optimization, Quasi-convex function, Quasi-convex subdifferential, Simultaneous method, Subgradient method, Functional constraints