

On the Nonmonotone Line Search in Gradient Sampling Methods for Nonconvex and Nonsmooth Optimization

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Abstract

A wide variety of real problems face the difficulty of minimizing a locally Lipschitz function $f : \mathbb{R}^n \rightarrow \mathbb{R}$ not necessarily differentiable for all $x \in \mathbb{R}^n$. Although many of these problems have been successfully solved with methods involving Gradient Sampling (GS), in practice, the algorithms have better results when the Armijo's sufficient decrease condition (which plays an important role in the convergence theory) is not required, asking just for $f(x^{k+1}) < f(x^k)$. This suggests that a nonmonotone line search could improve the performance of these methods. In this study, we introduce convergence results for the GS algorithm with two well known nonmonotone line searches. Finally, we present preliminary comparative tests with the original method.

Keywords. nonmonotone line search; gradient sampling methods; nonconvex optimization; nonsmooth optimization.

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