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A memory gradient method for non-smooth convex optimization.

Summary: Based on the Moreau-Yosida regularization and a modified line search technique, this paper presents an implementable memory gradient method for solving a possibly non-differentiable convex minimization problem by converting the original objective function to a once continuously differentiable function. A main feature of this proposed method is that at each iteration, it sufficiently uses the previous multi-step iterative information and avoids the storage and computation of some matrices. Moreover, the proposed method makes use of approximate function and gradient values of the Moreau-Yosida regularization instead of the corresponding exact values. Under reasonable conditions, the convergence properties of the proposed algorithm are analysed. Preliminary numerical results show that the proposed method is efficient and can be applied to solve large-scale non-smooth optimization problems.

Keywords: non-smooth convex optimization; memory gradient method; non-monotone line search; convergence analysis
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