

Iteration-complexity and asymptotic analysis of steepest descent method for multiobjective optimization on Riemannian manifolds

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The steepest descent method for multiobjective optimization on Riemannian manifolds with lower bounded sectional curvature is analyzed in this paper. The aim of the paper is twofold. Firstly, an asymptotic analysis of the method is presented with three different finite procedures for determining the stepsize, namely, Lipschitz stepsize, adaptive stepsize and Armijo-type stepsize. The second aim is to present, by assuming that the objective function has Jacobian componentwise Lipschitz continuous, iteration-complexity bounds for the method with these three stepsizes. In addition, some examples are presented to emphasize the importance of working in this new context. Numerical experiments are provided to illustrate the effectiveness of the method in this new setting and certify the obtained theoretical results.

Keywords: Steepest descent method, multiobjective optimization problem, Riemannian manifold, lower bounded curvature, iteration-complexity bound.