A note on the worst-case complexity of nonlinear stepsize control algorithms for unconstrained optimization

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Abstract

A nonlinear stepsize control framework for unconstrained optimization was proposed by Toint (Optim Methods Softw 28:8295, 2013), generalizing many trust-region and regularization algorithms. More recently, Grapiglia, Yuan and Yuan (Math. Program. DOI 10.1007/s10107-014-0794-9) proved worst-case complexity bounds for this family of algorithms in the context of nonconvex problems. In this paper, certain classes of nonlinear stepsize control algorithms are shown to have improved worst-case complexity when applied to more specific types of problems, including convex and strongly convex ones.

Key words: Global convergence, Worst-case complexity, Trust-region methods, Regularization methods, Unconstrained optimization.

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