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HEAVY-BALL AND NESTEROV ACCELERATIONS WITH HESSIAN DRIVEN DAMPING IN QUASICONVEX OPTIMIZATION

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Strongly quasiconvex functions were introduced by Polyak in 1966 [4] as the natural extension of the strongly convex functions. This class of functions, has been proved to be interesting for generalized convexity theory, since preserves both theoretical properties and linear convergence for first-order algorithms [1, 2]. In this talk, we focus on new properties for differentiable strongly quasiconvex functions via the behaviour of its gradient and we apply them to the study of second order dynamical system with Hessian driven damping [3]. Under mild assumptions, we provide exponential convergence of the trajectories to the optimal solution for the minimization problem of a differentiable strongly quasiconvex function. Furthermore, we study the discretization procedure for the heavy ball method and Nesterov accelerations, we provide linear convergence for both methods as well as mitigation of the oscillations commonly observed in traditional momentum methods. Finally, and if the time allow us, we present numerical illustrations.

References

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