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ACCELERATED GRADIENT METHODS VIA INERTIAL SYSTEMS WITH HESSIAN-DRIVEN DAMPING

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We analyze the convergence rate of a family of inertial algorithms, which can be obtained by discretization of an inertial system with Hessian-driven damping. We recover a convergence rate, up to a factor of 2 speedup upon Nesterov's scheme, for smooth strongly convex functions. As a byproduct of our analyses, we also derive linear convergence rates for convex functions satisfying quadratic growth condition or Polyak-Łojasiewicz inequality. As a significant feature of our results, the dependence of the convergence rate on parameters of the inertial system/algorithm is revealed explicitly. This may help one get a better understanding of the acceleration mechanism underlying an inertial algorithm.

Based on joint work with Zepeng Wang, University of Groningen.

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