Leveraging "partial" smoothness for faster convergence in nonsmooth optimization

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Nonsmoothness and nonconvexity are significant challenges in large-scale optimization problems, such as training neural networks and solving inverse problems in computational imaging. Although first-order methods are commonly used to address these problems, they are often considered slow. In this presentation, we introduce a (locally) accelerated first-order method that violates this perception by solving "generic" nonsmooth equations at a superlinear rate. The central insight is that nonsmooth functions often exhibit "partial" smoothness, which can be leveraged through a novel generalization of Newton's method.

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