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Subgradient methods without convexity: error bounds, linear convergence, and statistical guarantees. Preliminary report.

Subgradient methods converge linearly on a convex function that grows sharply away from its solution set. In this talk, I will explain that the same is true for sharp functions that are only weakly convex, provided that the subgradient methods are initialized within a fixed tube around the solution set. A variety of statistical and signal processing tasks come equipped with good initialization, and provably lead to formulations that are both weakly convex and sharp. Therefore, in such settings, subgradient methods can serve as cheap local search procedures. I will illustrate the techniques on phase retrieval and covariance estimation problems. (Received February 05, 2018)