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Revisiting Inexact Fixed-Point Iterations for Min-Max Problems: Stochasticity and Structured Nonconvexity

In this talk, we revisit the analysis of inexact Halpern and Krasnosel'skii-Mann (KM) iterations for solving constrained and stochastic min-max problems. We relax the inexactness requirement on the computation of the resolvent in stochastic Halpern iteration and modify stochastic KM iteration to work with biased samples of the resolvent. We present the consequences of these results for solving constrained and stochastic convex-concave min-max problems, such as improved last iterate convergence guarantees. Then, we apply our developments to solve constrained nonconvex-nonconcave min-max problems satisfying cohyponotonicity assumption. Within this class of problems, we show how to expand the limit of nonmonotonicity that can be handled by first-order methods. (Joint work with Donghwan Kim and Stephen J. Wright)