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MATH+ Spotlight Talk

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An Inexact Generalized Conditional Gradient Method

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Abstract:

The primal-dual active point strategy (PDAP) is known to achieve asymptotically linear convergence rates on the task of minimizing the sum of a smooth, convex loss function and a non-smooth convex regularizer over a Banach space. Such problems find various fields of application, such as the prediction of the band-gap of Perovskites. PDAP outperforms non-accelerated generalized conditional gradient (GCG) methods at the cost of requiring exact solutions to two finite-dimensional optimization problems in each iteration. One of these problems is smooth and possibly non-convex, while the other is convex and non-smoothly regularized. In the present work, we propose an approach where the subproblems are not required to be solved exactly. We demonstrate that there exist practical error tolerances on the subproblems such that asymptotical linear convergence is preserved. We further propose a method that uses Newton update directions and that reaches asymptotical quadratic convergence while avoiding clustering issues that are common in GCG and PDAP.