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Conditional extragradient algorithms for variational inequalities

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Abstract: “In this talk, we generalize the classical extragradient algorithm for solving variational inequality problems by utilizing non-null normal vectors of the feasible set. In particular, two conceptual algorithms are proposed and each of them has three different variants which are related to modified extragradient algorithms.

Our analysis contains two main parts: The first part contains two different linesearches, one on the boundary of the feasible set and the other one along the feasible direction. The linesearches allow us to find suitable halfspaces containing the solution set of the problem. By using non-null normal vectors of the feasible set, these linesearches can potentially accelerate the convergence. If all normal vectors are chosen as zero, then some of these variants reduce to several well-known projection methods proposed in the literature for solving the variational inequality problem. The second part consists of three special projection steps, generating three sequences with different interesting features.

Convergence analysis of both conceptual algorithms is established assuming existence of solutions, continuity and a weaker condition than pseudomonotonicity on the operator. Examples, on each variant, show that the modifications proposed here perform better than previous classical variants. These results suggest that our scheme may significantly improve the extragradient variants.”

Everyone is welcome to enjoy the talk

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