

Invited Talk Abstract

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On Circumcentered Direct Methods for Monotone Variational Inequality Problems

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Date	July 28, 2026
Time	16:00–16:30
Session	Session 5
Venue	S102, Lecture Hall, Gong-Guan Campus, NTNU

Abstract

The variational inequality problem (VIP) plays a central role in the theory and applications in continuous optimization. In particular, minimization problems and KKT systems can be regarded as VIPs. In this work, we present the first methods using circumcenters for solving VIPs. The circumcentered-reflection method (CRM) is a projection-based tool developed with the aim of finding a point in the intersection of finitely many closed convex sets. CRM has gone through enhancements and adaptations over the last few years and was proven to be faster in many settings than competitors such as alternating projections and the Douglas-Rachford methods. One of CRM features is that it is able to deal with approximate projections, as we do in this paper. Here, we present circumcenter schemes that solve VIPs with two types of operators: paramonotone and monotone ones. For the former we employ exact projections, whereas for the latter we base our approach on approximate ones. We establish convergence results for both methods and we perform numerical experiments, which show a remarkable performance when compared to other well know methods, like the extragradient algorithm.

References

- [1] R. Behling, Y. Bello-Cruz, A. Iusem, D. Liu, and L.-R. Santos, On Circumcentered Direct Methods for Monotone Variational Inequality Problems. *arXiv*, 2026. doi: 10.48550/arXiv.2506.17814. arXiv:2506.17814 [math]. Preprint.