

Finding a best approximation pair of points for two polyhedra

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Abstract

Given two disjoint convex polyhedra, we look for a best approximation pair relative to them, i.e., a pair of points, one in each polyhedron, attaining the minimum distance between the sets. Cheney and Goldstein [1] showed that alternating projections onto the two sets, starting from an arbitrary point, generate a sequence whose two interlaced subsequences converge to a best approximation pair. We propose in [2] a process based on projections onto the half-spaces defining the two polyhedra, which are more negotiable than projections on the polyhedra themselves. A central component in the proposed process is the Halpern–Lions–Wittmann–Bauschke (HLWB) algorithm for approaching the projection of a given point onto a convex set.

Based on joint work with Ron Aharoni and Zilin Jiang.

References

- [1] W. Cheney and A. A. Goldstein, Proximity maps for convex sets, *Proceedings of the American Mathematical Society*, 10:448–450, 1959.
- [2] R. Aharoni, Y. Censor and Z. Jiang, Finding a best approximation pair of points for two polyhedra, *Computational Optimization and Applications*, 71:509–523, 2018.