Ouyang, Hui
Finite convergence of locally proper circumcentered methods. (English) [Zbl 07564732]
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Summary: In view of the great performance of circumcentered isometry methods for solving the best approximation problem, in this work we further investigate the locally proper circumcenter mapping and circumcentered method. Various examples of locally proper circumcenter mapping are presented and studied. Inspired by some results on the circumcentered-reflection method by R. Arefidamghani, R. Behling, Y. Bello-Cruz, A. N. Iusem and L. R. Santos [The block-wise circumcentered-reflection method, Comp. Optimization Appl. 76/3 (2019) 675–699; The circumcentered-reflection method achieves better rates than alternating projections, ibid. 79/2 (2021) 507–530; On the circumcentered-reflection method for the convex feasibility problem, Num. Algorithms 86/4 (2021) 1475–1494], we provide sufficient conditions for one-step convergence of circumcentered isometry methods for finding the best approximation point onto the intersection of fixed point sets of related isometries. In addition, we elaborate the performance of circumcentered reflection methods induced by reflectors associated with hyperplanes and halfspaces for finding the best approximation point onto (or a point in) the intersection of hyperplanes and halfspaces.

MSC:
41A50 Best approximation, Chebyshev systems
90C25 Convex programming
41A25 Rate of convergence, degree of approximation
47H09 Contraction-type mappings, nonexpansive mappings, A-proper mappings, etc.
47H04 Set-valued operators
46B04 Isometric theory of Banach spaces

Keywords:
best approximation problem; feasibility problem; circumcenter mapping; circumcentered method; properness; halfspace; hyperplane; finite convergence

Full Text: Link

References:


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