

On Circumcentered-Reflection Methods

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In this talk, we present variants of the circumcentered reflection method (CRM) for the Convex Feasibility Problem (CFP), ensuring superlinear and finite convergence under standard assumptions. Developed with the aim of accelerating classical projection algorithms, CRM is an effective method for tracking a common point of a finite number of affine sets. In the case of general convex sets, CRM was shown to converge by using Pierra's product space reformulation, or if we reach a region consisting of what we refer to as centralized points, where pure circumcenter steps possess properties yielding convergence. In addition to having global convergence, CRM converges linearly under an error-bound condition and superlinearly if the two target sets are so that their intersection has a nonempty interior, and their boundaries are locally differentiable manifolds. Moreover, for CRM, we can replace exact projections onto the convex sets with projections onto separating halfspaces, perturbed by positive exogenous parameters, to achieve finite convergence.

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