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On circumcenter mappings induced by nonexpansive operators. (English) Zbl 07420149

Summary: We introduce the circumcenter mapping induced by a set of (usually nonexpansive) operators. One prominent example of a circumcenter mapping is the celebrated Douglas-Rachford splitting operator. Our study is motivated by the circumcentered-Douglas-Rachford method recently introduced by Behling, Bello Cruz, and Santos in order to accelerate the Douglas-Rachford method for solving certain classes of feasibility problems. We systematically explore the properness of the circumcenter mapping induced by reflectors or projectors. Numerous examples are presented. We also present a version of Browder’s demiclosedness principle for circumcenter mappings.

MSC:
47H09 Contraction-type mappings, nonexpansive mappings, A-proper mappings, etc.
47H04 Set-valued operators
41A50 Best approximation, Chebyshev systems
90C25 Convex programming

Keywords:
Browder’s demiclosedness principle; circumcenter, circumcenter mapping; nonexpansive; projector; reflector