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On a problem of Gulevich on nonexpansive maps in uniformly convex Banach spaces

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Abstract: Let X be a uniformly convex Banach space, $D \subset X$, $f : D \to X$ a nonexpansive map, and K a closed bounded subset such that $\overline{\text{co}}K \subset D$. If (1) $f|_K$ is weakly inward and K is star-shaped or (2) $f|_K$ satisfies the Leray-Schauder boundary condition, then f has a fixed point in $\overline{\text{co}}K$. This is closely related to a problem of Gulevich [Gu]. Some of our main results are generalizations of theorems due to Kirk and Ray [KR] and others.

Keywords: uniformly convex, Banach space, Hilbert space, contraction, nonexpansive map, weakly inward map, demi-closed, Rothe condition, Leray-Schauder condition, (KR)-bounded, Opial's condition
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