A VARIATIONAL INEQUALITY THEORY
FOR CONSTRANGED PROBLEMS
IN REFLEXIVE BANACH SPACES

T. M. ASFAW

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Abstract. Let $X$ be a real locally uniformly convex reflexive Banach space with the locally uniformly convex dual space $X^*$, and let $K$ be a nonempty, closed, and convex subset of $X$. Let $T : X \supseteq D(T) \rightarrow 2^{X^*}$ be maximal monotone, let $S : K \rightarrow 2^{X^*}$ be bounded and of type $(S_+$), and let $C : X \supseteq D(C) \rightarrow X^*$ with $D(T) \cap D(\partial \phi) \cap K \subseteq D(C)$. Let $\phi : X \rightarrow (-\infty, \infty]$ be a proper, convex, and lower semicontinuous function. New existence theorems are proved for solvability of variational inequality problems of the type VIP$(T+S+C, K; \phi; f)$ if $C$ is compact and VIP$(T+C, K; \phi; f)$ if $T$ is of compact resolvent and $C$ is bounded and continuous. Various improvements and generalizations of the existing results for $T+S$ and $\phi$ are obtained. The theory is applied to prove existence of solution for nonlinear constrained variational inequality problems.

References


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