ON ACCRETIVE MULTIVALUED MAPPINGS

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Let X be a real normed linear space, X^* its dual, $\langle\ ,\ \rangle$ the pairing between X and X^*, J a duality mapping from X into 2^{X^*} defined by $J(u)=\{u^*\in X^*: \langle u^*,u\rangle = \|u\|^2, \|u^*\| = \|u\|\}$, $u\in X$. Recall that a multivalued mapping $A:X \longrightarrow 2^X$ is said to be: (i) accretive on $D(A)=\{u\in X: A(u)\neq\emptyset\}$ if for each $u,v\in D(A)$ and each $x\in A(u)$ and $y\in A(v)$ there exists an element $x^*\in J(u-v)$ such that $\langle x-y,x^*\rangle \geqq 0$; (ii) maximal accretive on D(A), if A is accretive on D(A) and its graph $G(T)=\{(u,x)\in X\times X: u\in D(A), x\in A(u)\}$ is not properly contained in the graph of any other accretive mapping defined on D(A).

Theorem. Let X be a reflexive Fréchet smooth Banach space, $A:X\longrightarrow 2^X$ a multivalued maximal accretive mapping such that int $D(A)\neq\emptyset$. Then A is single-valued and norm-to-norm upper semicontinuous on a dense G_δ subset of int D(A).

In comparison with maximal monotone operators (see for instance [1],[2],[3]),the single-valuedness and the continuity properties of maximal accretive mappings ([4]) deeply rely on the structure of Banach spaces.

References:

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