

Josef Kolomý

On accretive multivalued mappings

Commentationes Mathematicae Universitatis Carolinae, Vol. 27 (1986), No. 2, 420

Persistent URL: <http://dml.cz/dmlcz/106462>

Terms of use:

© Charles University in Prague, Faculty of Mathematics and Physics, 1986

Institute of Mathematics of the Academy of Sciences of the Czech Republic provides access to digitized documents strictly for personal use. Each copy of any part of this document must contain these *Terms of use*.



This paper has been digitized, optimized for electronic delivery and stamped with digital signature within the project *DML-CZ: The Czech Digital Mathematics Library* <http://project.dml.cz>

ON ACCRETIVE MULTIVALUED MAPPINGS

Josef Kolomý (Math. Institute, Charles University, Sokolovská 83, 18600 Praha 8, Czechoslovakia), received 28.3. 1986.

Let X be a real normed linear space, X^* its dual, $\langle \cdot, \cdot \rangle$ 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 $A: X \rightarrow 2^X$ 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 $\langle x-y, x^* \rangle \geq 0$; (ii) maximal accretive on $D(A)$, if A is accretive on $D(A)$ and its graph $G(A) = \{(u, x) \in X \times X : u \in D(A), x \in A(u)\}$ 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, $A: X \rightarrow 2^X$ a multivalued maximal accretive mapping such that $\text{int } D(A) \neq \emptyset$. Then A is single-valued and norm-to-norm upper semi-continuous on a dense G_σ subset of $\text{int } D(A)$.

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:

- [1] J.P.R. Christensen, P.S. Kenderov: Dense strong continuity of mappings and the Radon-Nikodym property, Math. Scand. 54 (1984), 70-78.
- [2] P.S. Kenderov: Multivalued monotone mappings are almost everywhere singlevalued, Studia Math. 56(1976), 199-203.
- [3] P.S. Kenderov: Monotone operators in Asplund spaces, Compt. Rend. Acad. Sci. Bulgare 30(1977), 963-964.
- [4] J. Kolomý: Set-valued mappings and structure of Banach spaces, Rend. Circolo Mat. di Palermo (to appear).