1025-49-254 **Pando G Georgiev*** (pgeorgie@ececs.uc.edu), CS Department, University of Cincinnati ML 0030, Rhodes Hall, Room 832, PO Box 210030, Cinainnati, OH 45219. *New results on submonotone operators in Banach spaces via variational analysis.* Preliminary report.

We define appropriate non-convex analogues of the Fitzpatrick function $F(x, x^*)$ and its generalizations (see recent papers of J. Borwein and collaborators) for representation of a multivalued submonotone operator T. More convenient, however, for such a representation it appears to be the partial conjugate of $F(x, x^*)$ with respect to the second variable, $F^*(x, z)$, which is convex on z and has the property $Tx \subseteq \partial_2 F^*(x, x)$ (the convex subdifferential of $F^*(x, .)$ at x) with equality for every x if and only if T is *maximal*. Such a representation allows us to give simple proofs of new surjectivity theorems for coercive operators in reflexive spaces, Rockafellar-Minty type theorems, etc. The proofs use the parametric Ekeland variational principle and are new even for monotone operators. Simple proofs are given as well of the maximality of the subdifferential mapping ∂f when f is a convex l.s.c. function (Rockafellar's theorem) and more generally, when f is l.s.c. *approximately convex*. We show that the minimal w^*-cusco mappings from E to 2^{E^*} are representable, so analogues of the above theorems are valid for them too. (Received January 23, 2007)