

Characterizations of convex approximate subdifferential calculus in Banach spaces

Abstract We establish subdifferential calculus rules for the sum of convex functions defined on normed spaces. This is achieved by means of a condition relying on the continuity behavior of the inf-convolution of their corresponding conjugates, with respect to any given topology intermediate between the norm and the weak* topologies on the dual space. Such a condition turns out to be also necessary in Banach spaces. These results extend both the classical formulas by Hiriart Urruty-Phelps [1993] and by Thibault [1997].

Key words. Convex functions, approximate subdifferential, calculus rules, approximate variational principle.

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