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Convex approximators, convexificators and exhausters: applications to constrained extremum problems. (English) [Zbl 1016.90054](#)

Demyanov, V. (ed.) et al., Quasidifferentiability and related topics. Dedicated to Prof. Franco Giannessi on his 65th birthday and to Prof. Diethard Pallaschke on his 60th birthday. Dordrecht: Kluwer Academic Publishers. Nonconvex Optim. Appl. 43, 297-327 (2000).

Summary: The concepts of upper convex approximator, and convexificator and the one of exhauster, recently introduced, are exploited here to study constrained extremum problems involving functions that fail to admit convex generalized derivatives or even to be quasidifferentiable, or locally Lipschitz. New necessary optimality conditions of the Lagrange type, expressible in terms of these new concepts, are derived and several other already known results of this kind are obtained as a special case of the former ones. These general conditions enable us to face nonsmooth optimization problems for which tools, such as the Clarke subdifferential or the quasidifferentials, cannot be invoked in building multiplier rules.

For this purpose, a characterization of the semicontinuity property in terms of existence of unilateral exhausters, is also provided refining and extending the obtained result to the class of positively homogeneous (of degree one) functionals defined on arbitrary uniformly convex Banach spaces.

For the entire collection see [\[Zbl 0949.00047\]](#).

MSC:

[90C30](#) Nonlinear programming
[49K27](#) Optimality conditions for problems in abstract spaces
[90C48](#) Programming in abstract spaces
[49J52](#) Nonsmooth analysis

Cited in **20** Documents

Keywords:

first-order necessary optimality conditions; Lagrange multipliers; upper convex approximators; convexificator; exhauster; generalized derivatives; nonsmooth optimization; semicontinuity