

**Shapiro, Alexander**

**Quasidifferential calculus and first-order optimality conditions in nonsmooth optimization.**

(English) [Zbl 0604.49012](#)

Math. Program. Study 29, 56-68 (1986).

This paper is concerned with first-order optimality conditions for nonsmooth extremal problems. The author first studies positively homogeneous functions (differences of sublinear functions) which are used later in local approximations and difference convex domains. A theorem stating a necessary and sufficient condition for a positively homogeneous function  $\phi$  to belong to the linear space of difference sublinear functions on  $E_n$  is proved. Furthermore it is proved that every closed cone  $C$  is associated with a difference sublinear function  $\phi$  such that  $C = \{x | \phi(x) \leq 0\}$ . After some further remarks on quasidifferentiable functions and approximations using difference sublinear functions the last section concerns first-order optimality conditions and the theory of quasidifferential calculus developed earlier.

Reviewer: G.van der Hoek

**MSC:**

[49J52](#) Nonsmooth analysis

[26B05](#) Continuity and differentiation questions

[49K10](#) Optimality conditions for free problems in two or more independent variables

[90C30](#) Nonlinear programming

Cited in **1** Review  
Cited in **13** Documents

**Keywords:**

first-order optimality conditions; nonsmooth extremal problems; positively homogeneous functions; difference convex domains; difference sublinear functions; quasidifferentiable functions

**Full Text:** [DOI](#)