

SEPARATION BY STRONGLY h -CONVEX FUNCTIONS

BELLA POPOVICS

Abstract. The convex separation problem is studied intensively in many situation: It is answered for the cases of classical convexity, strong convexity, h -convexity and strong h -convexity with multiplicative h . In the case of h -convexity, multiplicativity turns out to be considerably relaxed. The aim of the present note is to give common generalization of these results, that is, to give sufficient and necessary conditions for the existence of strongly h -convex separators with no further assumption on multiplicativity.

Mathematics subject classification (2010): Primary 39B82, Secondary 39B62, 26A51, 52A37.

Keywords and phrases: Convexity, strong convexity, h -convexity, separation problems.

REFERENCES

- [1] H. ANGULO, J. GIMÉNEZ, A.-M. MOROS AND K. NIKODEM, *On strongly h -convex functions*, Ann. Funct. Anal., **2**, 2 (2011), 85–91.
- [2] K. BARON, J. MATKOWSKI AND K. NIKODEM, *A sandwich with convexity*, Math. Pannon., **5**, 1 (1994), 139–144.
- [3] M. BESSENYEI, Á. KONKOLY, AND B. POPOVICS, *Convexity with respect to Beckenbach families*, J. Convex Anal., **24**, 1 (2017), 75–92.
- [4] M. BESSENYEI AND ZS. PÁLES, *Separation by linear interpolation families*, J. Nonlinear Convex Anal., **13**, 1 (2012), 49–56.
- [5] M. BESSENYEI AND E. PÉNZES, *Separation problems in context of h -convexity*, J. Convex Anal. **25** (2018), no. 4, (to appear).
- [6] M. BESSENYEI AND B. POPOVICS, *Convexity without convex combinations*, J. Geom., **107**, 1 (2016), 77–88.
- [7] M. BESSENYEI AND P. SZOKOL, *Separation by convex interpolation families*, J. Convex Anal., **20**, 4 (2013), 937–946.
- [8] T. LARA, N. MERENTES AND K. NIKODEM, *Strong h -convexity and separation theorems*, Int. J. Anal., art. ID 7160348, (2016).
- [9] N. MERENTES AND K. NIKODEM, *Remarks on strongly convex functions*, Aequationes Math., **80**, 1-2 (2010), 193–199.
- [10] N. MERENTES AND K. NIKODEM, *Strong convexity and separation theorems*, Aequationes Math., **90**, 1 (2016), 47–55.
- [11] K. NIKODEM AND SZ. WĄSOWICZ, *A sandwich theorem and Hyers-Ulam stability of affine functions*, Aequationes Math., **49**, 1-2 (1995), 160–164.
- [12] A. OLBRYŚ, *On separation by h -convex functions*, Tatra Mt. Math. Publ., **62**, (2015), 105–111.
- [13] B. T. POLYAK, *Existence theorems and convergence of minimizing sequences in extremum problems with restrictions*, Soviet Math. Dokl., **7**, (1966), 72–75.
- [14] S. VAROŠANEC, *On h -convexity*, J. Math. Anal. Appl., **326**, 1 (2007), 303–311.
- [15] J.-P. VIAL, *Strong convexity of sets and functions*, J. Math. Econom., **9**, 1–2 (1982), 187–205.