CONVEXITY IN REAL ANALYSIS

Abstract

We treat the classical notion of convexity in the context of hard real analysis. Definitions of the concept are given in terms of defining functions and quadratic forms, and characterizations are provided of different concrete notions of convexity. This analytic notion of convexity is related to more classical geometric ideas. Applications are given both to analysis and geometry.

This paper in its entirety can be found in Volume 36 Number 1 of this Exchange.

References

[1] Gautam Bharali and Berit Stensønes, Plurisubharmonic polynomials and bumping, Math. Z. 261 (2009), 39–63.
[2] T. Bonneson and W. Fenchel, Theorie der konvexen Körper, Springer-Verlag, Berlin, 1934.
[3] W. Fenchel, Convexity Through the Ages, Convexity and its Applications, Birkhäuser, Basel, 1983, 120–130.
[4] L. Hörmander, Notions of Convexity, Birkhäuser Publishing, Boston, MA, 1994.
[5] S. G. Krantz, Function Theory of Several Complex Variables, 2nd ed., American Mathematical Society, Providence, RI, 2001.

Mathematical Reviews subject classification: Primary: 26B25; Secondary: 52A05, 26B10, 26B35

Key words: convex domain, convex function, Hessian, quadratic form, finite order

*The research for this paper was supported in part by the National Science Foundation and by the Dean of the Graduate School of Washington University
[6] S. G. Krantz and H. R. Parks, *The Geometry of Domains in Space*, Birkhäuser Publishing, Boston, MA, 1999.

[7] S. G. Krantz and H. R. Parks, *The Implicit Function Theorem*, Birkhäuser, Boston, 2002.

[8] S. R. Lay, *Convex Sets and Their Applications*, John Wiley and Sons, New York, 1982.

[9] L. Lempert, *La metrique Kobayashi et las representation des domains sur la boule*, Bull. Soc. Math. France, 109 (1981), 427–474.

[10] B. O’Neill, *Elementary Differential Geometry*, Academic Press, New York, 1966.

[11] F. A. Valentine, *Convex Sets*, McGraw-Hill, New York, 1964.

[12] V. Vladimirov, *Methods of the Theory of Functions of Several Complex Variables*, MIT Press, Cambridge, 1966.

[13] A. Zygmund, *Trigonometric Series*, Cambridge University Press, Cambridge, UK, 1968.