

QUASILINEAR MAPPINGS, M -IDEALS AND POLYHEDRA

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Abstract. We survey the connection between two results from rather different areas: failure of the 3-space property for local convexity (and other properties) within the category of quasi-Banach spaces, and the irreducibility (in the sense of Minkowski difference) of large families of finite dimensional polytopes.

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REFERENCES

- [1] E. M. ALFSEN, E. G. EFFROS, *Structure in real Banach spaces. I*, Ann. of Math. (2) **96** (1972), 98–128.
- [2] Y. BENYAMINI, J. LINDENSTRAUSS, *Geometric nonlinear functional analysis. Vol. 1*, American Mathematical Society Colloquium Publications, **48**, American Mathematical Society, Providence, RI, 2000.
- [3] J. M. F. CASTILLO, *Snarked sums of Banach spaces*, Extr. Math. **12** (1997), 117–128.
- [4] J. M. F. CASTILLO, M. GONZÁLEZ, *Three-space problems in Banach space theory*, Lecture Notes in Mathematics, **1667**, Springer-Verlag, Berlin, 1997.
- [5] P. ENFLO, J. LINDENSTRAUSS, G. PISIER, *On the “three space problem”*, Math. Scand. **36** (1975), 199–210.
- [6] B. GRÜNBAUM, *Measures of symmetry for convex sets*, Proc. Sympos. Pure Math. **7** (1963), 233–270.
- [7] P. HARMAND, W. WERNER, D. WERNER, *M -ideals in Banach spaces and Banach algebras*, Lecture Notes in Mathematics, **1547**, Springer-Verlag, Berlin, 1993.
- [8] P. J. HILTON, U. STAMMBACH, *A course in homological algebra*, Second edition, Graduate Texts in Mathematics, **4**, Springer-Verlag, New York–Berlin, 1971.
- [9] M. KALLAY, *Indecomposable polytopes*, Israel J. Math. **41** (1982), 235–243.
- [10] N. J. KALTON, *The three space problem for locally bounded F -spaces*, Compositio Math. **37** (1978), 243–276.
- [11] N. J. KALTON, *Convexity, type and the three space problem*, Studia Math. **69** (1980/81), 247–287.
- [12] N. J. KALTON, N. T. PECK, *Twisted sums of sequence spaces and the three space problem*, Trans. Amer. Math. Soc. **255** (1979), 1–30.
- [13] N. J. KALTON, J. W. ROBERTS, *Uniformly exhaustive submeasures and nearly additive set functions*, Trans. Amer. Math. Soc. **278** (1983), 803–816.
- [14] Á. LIMA, *Intersection properties of balls and subspaces in Banach spaces*, Trans. Amer. Math. Soc. **227** (1977), 1–62.
- [15] Á. LIMA, *On M -ideals and best approximation*, Indiana Univ. Math. J. **31** (1982), 27–36.
- [16] Á. LIMA, D. YOST, *Absolutely Chebyshev subspaces*, Proc. Centre Math. Anal. Austral. Nat. Univ. **20** (1988), 116–127.
- [17] K. PRZEŚLAWSKI, D. YOST, *Decomposability of polytopes*, Discrete Comput. Geom. **39** (2008), 460–468.
- [18] K. PRZEŚLAWSKI, D. YOST, *More indecomposable polytopes*, to appear.
- [19] M. RIBE, *Examples for the nonlocally convex three space problem*, Proc. Amer. Math. Soc. **73** (1979), 351–355.
- [20] G. C. SHEPHARD, *Reducible convex sets*, Mathematika **13** (1966), 49–50.

- [21] D. YOST, *The n -ball properties in real and complex Banach spaces*, Math. Scand. **50** (1982), 100–110.
- [22] D. YOST, *Irreducible convex sets*, Mathematika **38** (1991), 134–155.