

On the Algebraic Properties of Convex Bodies and Some Applications

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Abstract: We extend the set of convex bodies up to differences (factorized pairs) of convex bodies; thereby (Minkowski) multiplication by real scalar is extended in a natural way. We show that differences of convex bodies form a special quasilinear space with group structure. The latter is abstractly studied by introducing analogues of linear combinations, dependence, basis, associated linear spaces etc. A theorem of H. Radström for embedding of convex bodies in a normed vector space is generalized. Support functions and their differences are discussed in relation to quasilinear spaces.

Keywords: (differences of) convex bodies, Minkowski operations, quasilinear spaces, (differences of) support functions

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