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Groups of Convex Bodies

Abstract: I will explain how to define and study a topological "group of convex bodies", whose elements are linear combinations of convex bodies in a fixed euclidean space, analogous to the scissors congruence group or McMullen's polytope algebra. The main definition is crafted just so that a continuous valuation on convex bodies is the same thing as a continuous homomorphism on the group of convex bodies, and the main result states that the group of convex bodies is, in fact, essentially a topological vector space. In order to describe continuous valuations we are forced to consider topological groups, and I'll explain how this makes life difficult. I'm usually an algebraic topologist, and so I'll also explain my motivation, which comes from algebraic K-theory.