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Refinements of the Brunn-Minkowski Inequality

The Brunn-Minkowski theorem says that $\text{vol}((1 - \lambda)K + \lambda L)^{1/n}$, for K, L convex bodies, is a concave function in λ , and assuming a common hyperplane projection of K and L , it was proved that the volume itself is concave. In this paper we study refinements of Brunn-Minkowski inequality, in the sense of ‘enhancing’ the exponent, either when a common projection onto an $(n - k)$ -plane is assumed or for particular families of sets. In the first case, we show that the expected result of concavity for the k -th root of the volume is not true, although other Brunn-Minkowski type inequalities can be obtained under the $(n - k)$ -projection hypothesis. In the second case, we show that for p -tangential bodies, the exponent in Brunn-Minkowski inequality can be replaced by $1/p$.

Keywords: Brunn-Minkowski inequality, projections, p -tangential bodies.

MSC: 52A20, 52A40; 52A39