On the geometry of log concave measures

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Abstract

The perimeter of a convex set in $\mathbb{R}^n$ with respect to a given measure is the measure's density averaged against the surface measure of the set. It was proved by Ball in 1993 that the perimeter of a convex set in $\mathbb{R}^n$ with respect to the standard Gaussian measure is asymptotically bounded from above by $n^{1/4}$. Nazarov in 2003 showed the sharpness of this bound. We are going to discuss the question of maximizing the perimeter of a convex set in $\mathbb{R}^n$ with respect to any log-concave rotation invariant probability measure. The latter asymptotic maximum is expressed in terms of the measure's natural parameters: the expectation and the variance of the absolute value of the random vector distributed with respect to the measure. We are also going to discuss some related questions on the geometry and isoperimetric properties of log-concave measures.