GEOMETRIC PROPERTIES OF INTERSECTION BODIES

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Intersection bodies are convex bodies whose radial function is a positive definite distribution. They were introduced in 1988 by Lutwak in connection to the Busseman-Petty problem. They also appear as duals of zonoids (convex bodies that can be approximated by polytopes that are sums of segments). In general, no much is known about the geometry of intersection bodies, even of those that are polytopes. Recently, Fourier analytic techniques have been introduced in the study of convex bodies, yielding results such as the analytic solution to the Busseman-Petty problem in all dimensions. In 1998, Koldobsky found a necessary condition for a convex body to be an intersection body in terms of the second derivative of its norm. This result allowed him to prove that the unit ball of the q-sum of two spaces X and Y is not an intersection body for finite q. In our work we use the techniques of Koldobsky to prove that, in dimension 7 or more, an intersection body cannot be a direct sum of two convex bodies. We also find conditions for a body of revolution that has a face to be an intersection body. This is a joint work with D. Ryabogin and A. Zvavitch.