The zonoid algebra and random intersections in symmetric spaces

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We assign to a compact symmetric space M a commutative graded algebra, whose elements are certain convex bodies (zonoids) in the exterior algebra of the cotangent space V of M. They can be viewed equivalently as measures on the Grassmann manifolds of V. This Grassmann zonoid algebra allows to describe the intersection of randomly moved submanifolds of M, much like the cohomology algebra of M describes intersections with sign count. Moreover, the link to convexity enforces inequalities in the style of the Alexandrov Fenchel inequality. There is a close connection to the theory of valuations. Joint work (in progress) with Paul Breiding, Antonio Lerario and Leo Mathis