Agranovsky, Mark; Boman, Jan; Koldobsky, Alexander; Vassiliev, Victor; Yaskin, Vladyslav
Algebraically integrable bodies and related properties of the Radon transform. (English)
[Zbl 1523.14014]
Geom. 9, 1-36 (2023).

When generalizing Lemma 28 from Newton’s “Principia”, V. I. Arnold asked for a complete characteriza-
tion of algebraically integrable domains. In the present survey the authors describe the current state of
the problem.

To this end they study algebraic properties of two important volumetric characteristics in geometric
tomography. For a body $K \subset \mathbb{R}^n$, $\xi \in S^{n-1}$ and $t \in \mathbb{R}$, the cutoff function of $K$ represents the $n$-
dimensional volume of the parts of $K$ cut by the hyperplane perpendicular to $\xi$ at distance $t$ from the
origin. The section function of $K$ is the $(n - 1)$-dimensional volume of the section of $K$ by the same
hyperplane. In the survey closely related problems involving the Radon transform of indicator functions
are also considered.

For the entire collection see [Zbl 1519.42002].

Reviewer: Vladimir P. Kostov (Nice)

MSC:
14D05 Structure of families (Picard-Lefschetz, monodromy, etc.)
42B10 Fourier and Fourier-Stieltjes transforms and other transforms of Fourier type
44A12 Radon transform
44A99 Integral transforms, operational calculus
52A20 Convex sets in $n$ dimensions (including convex hypersurfaces)

Keywords:
integrability; analytic continuation; monodromy; Picard-Lefschetz theory; Radon transform; convex body;
Fourier transform

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