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Let $M$ be an $n$-dimensional ($n \geq 2$) simply connected, compact, Riemannian manifold of class $C^\infty$ with metric tensor $g = (g_{ij})$ and strictly convex boundary. If $\sigma$ is the symmetrizing operator and $\nabla$ denotes covariant differentiation with respect to $g$, define $d = \sigma \nabla$. The description of the structure of those $M$ on which there is a tensor field $u$ of valency $2k-1$ satisfying $du = \sigma(g \otimes g \otimes g \otimes ... \otimes g)$ (k factors) or $du = 0$ seems to be an open problem, which is related to the problem of determining the structure of Riemannian spaces from integrals along geodesics. The paper contains some rather involved statements related to these problems.

Reviewer: L.A. Santaló

MSC:

53C65 Integral geometry
53C20 Global Riemannian geometry, including pinching

Keywords:
Riemannian manifold; strictly convex boundary; tensor field; integrals along geodesics