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On problem of the reconstruction of metric on the Riemannian manifold

On a compact Riemannian manifold M with a boundary D we consider the problem of the reconstruction of the Riemannian metric g if are known the lengths of geodesics with endpoints on the boundary D of M. First results, namely an uniqueness and stability for this non-linear problem in a general formulation, have been got by the auther in 1977. In present time the auther obtains some results when geodesics are reflected from the part L of the boundary D of M and also for the linearized problem that is the integral geometry problem. The auther also gets in connection of this problem some formula: the symplectic volume and from here the Riemannian volume of M is expressed only by the lengths of geodesics with endpoints on the boundary D without L. In this formula the metric g is unknown and the manifold M is not known as the part L of the boundary D is unknown. The considered problems refer to the Riemannian geometry, also to the symplectic geometry (in proofs is used 1-contact form, see: C. Godbillon, *Geometrie Differentielle et Mecanique Analytique*). The near similar problems are also used in geophysics (structure of Earth) and the obtained results may stimulate the investigations of the new problems.