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ISOPERIMETRIC EXTREMALS OF ROTATION ON SPHERE

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Abstract. In this paper we will introduce a newly found knowledge above the existence and the uniqueness of isoperimetric extremals of rotation on two-dimensional (pseudo-) Riemannian manifolds and on surfaces on Euclidean space. We will obtain the fundamental equations of the existence of isoperimetric extremals of rotation on spheres. They are only and the only planar sections of the sphere.

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1. Introduction

A special diffeomorphisms between (pseudo-) Riemannian manifolds and manifolds with affine and projective connections, for which any special curve maps onto a special curve, were studied in many works. For example geodesic mappings, for which any geodesic maps onto geodesic. Analogically holomorphically-projective and F-planar mappings for which any analytic and F-planar curve maps onto analytic and F-planar curve, respectively; almost geodesic mapping is defined as, for any geodesic maps onto an almost geodesic curve, see [5, 8, 11].

Leiko [2–4] introduced rotary mappings for surfaces S_2 on Euclidean space and two-dimensional (pseudo-) Riemannian manifold V_2. A diffeomorphism between two-dimensional (pseudo-) Riemannian manifolds is called *rotary* if any geodesic is mapped onto isoperimetric extremal of rotation.

The isoperimetric extremals of rotation have a physical meaning as can be interpreted as trajectories of particles with a spin, see [2]. These results are local and are based on the known fact that a two-dimensional Riemannian manifold V_2 is implemented locally as a surface S_2 on Euclidean space. Therefore, we will deal