

GEODESIC MAPPINGS ONTO RIEMANNIAN MANIFOLDS AND DIFFERENTIABILITY

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Abstract. In this paper we study fundamental equations of geodesic mappings of manifolds with affine connection onto (pseudo-) Riemannian manifolds. We proved that if a manifold with affine (or projective) connection of differentiability class C^r ($r \geq 2$) admits a geodesic mapping onto a (pseudo-) Riemannian manifold of class C^1 , then this manifold belongs to the differentiability class C^{r+1} . From this result follows if an Einstein spaces admits non-trivial geodesic mappings onto (pseudo-) Riemannian manifolds of class C^1 then this manifold is an Einstein space, and there exists a common coordinate system in which the components of the metric of these Einstein manifolds are real analytic functions.

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1. Introduction

To the theory of geodesic mappings and transformations were devoted many papers, these results are formulated in a large number of research papers and monographs [3, 5–12, 14–28], etc.

First we studied the general properties of geodesic mappings of manifolds with affine and projective connection onto (pseudo-) Riemannian manifolds in dependence on the smoothness class of these geometric objects. Here we present some