Linear transformations of Finsler connections

Dedicated to Professor J. Kanitani on his 70th birthday

By

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We introduced, in a previous paper [1], a notion of a linear transformation of the tangent bundle B of a differentiable manifold M, which was a generalization of a notion of a transformation induced from the one of M. A Finsler connection is defined in a certain principal bundle Q, the base space of which is the total space B.

A theory of transformations of a Finsler connection by a linear transformation will be developed under a certain special condition. The paper [1] was devoted to the study of affine linear transformations, and we intend to treat a projective one. The present paper is written as necessary preparation for it. The terminologies and signs of the paper [1] will be used in the following without too much comment.

§ 1. Preliminaries

1 **Principal bundle Q**

In the first place, we recall the principal bundle Q, in which a Finsler connection is defined [1], [3].

Let $P(M, \pi, G)$ be the principal bundle of frames tangent to a differentiable manifold M of n dimensions. The group of structure is the full linear real group $GL(n, R)$, and an element g of G acts on P by $p \in P \to p \cdot g$, which is called a right translation R_g of P by g. The total space P is interpreted as the set of all admissible mappings $F \to B$, where F is a n-dimensional real vector space and