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Affine transformations of Finsler spaces

Dedicated to Professor Y. Akizuki on his 60th birthday

By

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The notion of Finsler space is based on the Finsler metric, in similar manner with the case of Riemann space. However, we may consider the geometry of spaces with an affine connection without Riemann metric, and have a beautiful theory of connections in principal bundles. Recently, a theory of Finsler spaces has been successfully developed by T. Okada [1] from a modern and global point of view. He introduce first a connection in a certain fibre bundle. The connection is composed of two distributions, and hence is called a pair-connection, which is of the most general type of connections derived from a Finsler metric by several authors. Thus we may say that a theory of connection of the Finsler type is established *without Finsler metric.*

The present paper is the first part of a series dealing with a theory of transformations of Finsler spaces. According to the theory due to T. Okada, affine transformations can be treated for Finsler spaces without use of the metric, parallel to the case for spaces with ordinary affine connection. The base space of the principal bundle in which a pair-connection is defined is the tangent vector bundle B of the manifold M unter consideration, and hence it is natural to start from transformations of B, not of M. We shall introduce linear transformations of B at the beginning of Section 2, which will be more general than that induced from transformations of M. It will be shown that a linear transformation of B is constituted from an induced part and a deviation,