ON THE STRUCTURE OF SPACES WITH NORMAL PROJECTIVE CONNEXIONS WHOSE GROUPS OF HOLONOMY FIX A HYPERQUADRIC OR A QUADRIC OF (N-2)-DIMENSION.*)

By

Shigeo Sasaki and Kentarô Yano.

Several years ago, we have studied the spaces with normal conformal connexions whose groups of holonomy fix a point or a hypersphere.[1] The most fundamental theorem that we have found is the following: If the group of holonomy of a space C_n with a normal conformal connexion is a subgroup of the Möbius' group which fixes a point (or a hypersphere), the C_n is a space with a normal conformal connexion corresponding to the class of Riemann spaces conformal to each other including an Einstein space with a vanishing (or non vanishing) scalar curvature. The converse is also true. Making use of the fact that a subgroup of the Möbius' group which fixes a hypersphere is in a close relation with the Poincaré's representation of non-Euclidean geometry, we could further generalize the Poincaré's representation of non-Euclidean geometry to Einstein spaces.

In the present paper, we shall apply that idea to spaces with normal projective connexions. In Klein's representation of non-Euclidean geometry the fundamental group of the space is the subgroup of all projective transformations which fix a hyperquadric. Hence we are led to consider those spaces with normal projective connexions whose groups of holonomy fix a hyperquadric. In connection with this, we also consider those spaces with normal projective connexions whose groups of holonomy fix an $(n-2)$ dimensional quadric in a hyperplane.

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1) S.Sasaki, On the spaces with normal conformal connexions whose groups of holonomy fix a point or a hypersphere, I, II, III, Jap. J. of Math., 34 (1942) pp. 615-622, pp. 623-633, 35 (1943) pp. 791-795.
K. Yano, Conformal and concircular geometries in Einstein spaces, Proc. Imp. Acad. Japan, 19 (1943) pp. 444-453.