GROUPS OF MOTIONS IN CONFORMALLY FLAT SPACES. II

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1. **Introduction.** In a previous paper with a similar title,* we have shown that all groups of motions admitted by a conformally flat metric space V_n must be subgroups of the general conformal group G_N of $N=\frac{1}{2}(n+1)(n+2)$ parameters generated by†

$$\xi^i = b^i + a_0x^i + x^ia_jx^j - \tfrac{1}{2}a_ie_ie_j(x^j)^2 + b_j^ix^j, \qquad e_i = \pm 1. \tag{1}$$

In (1), the b_j^i satisfy the relations $e_ib_j^i + e_jb_i^j = 0$, (i, j not summed). Otherwise the a's and b's in (1) are arbitrary.

To define a group of motions of V_n, the ξ^i must satisfy the equations

$$\xi^k \frac{\partial h}{\partial x^k} + h \frac{\partial \xi^i}{\partial x^i} = 0, \qquad i \text{ not summed}, \tag{2}$$

and the coordinates x^i of (2) are such that $g_{ij} = e_i\delta_j^ih^2$. Hence in this coordinate system, the metric has the form

$$ds^2 = h^2 \sum e_i(dx^i)^2. \tag{3}$$

In this paper we shall consider the simplest subgroups of G_N, and determine the nature of the function h corresponding to each. Also we give a restatement of Theorem 2 of I, since it is not complete as given.

2. **The group** G_N. The basis of the group G_N may be taken in the form

$$P_i = p_i, \tag{4}$$

$$S_{ij} = e_ix^ip_j - e_jx^jp_i, \qquad i, j \text{ not summed}, \tag{5}$$

$$U = x^ip_i, \tag{6}$$

$$V_i = 2x^ix^jp_j - e_ie_j(x^j)^2p_i, \tag{7}$$

where $p_i = \partial/\partial x^i$; and its commutators are‡

* *Groups of motions in conformally flat spaces*, this Bulletin, vol. 42 (1936), pp. 418–422. The results of this paper (which we refer to as I) will be assumed known.

† All small Latin indices take the values 1, 2, $\cdots$, n, with $n>2$, unless otherwise noted.

‡ S. Lie, *Theorie der Transformationsgruppen*, vol. 3, pp. 321–334.