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Spinor Calculus II.

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§ 1. Introduction.

In Spinor Calculus,[1] published in August 1938, we constructed from spinor $\psi \equiv \begin{pmatrix} \psi_1 \\ \psi_2 \\ \psi_3 \\ \psi_4 \end{pmatrix}$ the quantities (vectors and tensors) invariant by spin transformations, and investigated their properties. In this paper we shall study other properties of spinors.

In part I, corresponding to the fact that any 4-4 matrix can be expanded in terms of sedenion, we consider the expansion of any 1-4 matrix in terms of a certain definite set of bases, and by using this consideration, we shall obtain some relations between ψ and the spin-invariant quantities.

In part II, introducing the covariant differentiation of spinor, we shall find the relations among the spin-invariant quantities when ψ is the solution of the fundamental equation for ψ.

Part I.

§ 2. Preparatory statements.

As for the 4-4 matrices γ_i satisfying $\gamma_{(i}\gamma_{j)}=g_{ij}$ $(i, j=1, \ldots, 4)$, we obtained the following :[2]

Theorem 1. *The matrix A is determined uniquely, except for a real factor, such that*

$$A\gamma_i=(A\gamma_i)^\dagger \equiv \gamma_i^\dagger A^\dagger , \tag{2.1}$$

$$A^\dagger=A , \qquad |A| \neq 0 , \tag{2.2}$$

(1) T. Sibata; This Journal, **8** (1938), (W. G. No. 26), 169.

(2) loc. cit., 170.