Complete and Simpler Treatment of Wave Geometry.

By

Takasi SIBATA and Kakutarô MORINAGA.

(Received December 10, 1935.)

§ 1. Introduction.

In wave geometry(1) we have defined the expression for the metric in general microscopic space by

$$ds\psi = dx^i \gamma_i \psi$$

where γ's are $4-4$ matrices satisfying the equation

$$\gamma_{(i}\gamma_{j)} = g_{ij} I$$

and ψ is a $1-4$ matrix given as a solution of the "unknown Dirac equation." And we have investigated the transformations and parallel displacement which make $ds\psi = 0$ invariant. In this paper, from another point of view we shall consider the parallel displacements and the differential equations for ψ obtained by this parallelism.

§ 2. Vectors which satisfy the relation $\rho^i \gamma_i \psi = 0$.

First, we will show that there exists a vector ρ^i satisfying the relation:

$$\rho^i \gamma_i \psi = 0. \tag{2.1}$$

Since γ_i are expressed as

$$\gamma_i = U h_i^j \overset{\circ}{\gamma}_j U^{-1} \tag{2.2}$$

where h_j^i are defined by

$$g_{ij} = \sum_{l=1}^{4} h_i^l h_j^l ,$$

(1) K. Morinaga, Wave Geometry, This Journal, **5** (1935), 151.