Wave Geometry No. 35

Cosmology in Terms of Wave Geometry (V) Universe with Born-Type Electromagnetism.

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§ 1. Introduction.

In wave geometry it has been shown that the equation of motion of a particle is given by[1]

[I] in space with matter only

$$u^i\nabla_i u^j = Qu^j \tag{1.1}$$

where $u^j \equiv \psi^\dagger A\gamma^j\psi$,

and

[II] in space with Born-type electromagnetism[2]

$$u^i\nabla_i u^j = 2(M\overset{1}{F}{}^j_i + N\overset{2}{F}{}^j_i)u^i + Qu^j \tag{1.2}$$

where $\overset{1}{F}_{ij}$ and $\overset{2}{F}_{ij}$ are antisymmetric tensors.

Cosmology in terms of wave geometry has been developed on the assumption that the assemblage of nebulae is the universe and each nebula moves along the path determined by (1.1) But if, besides nebulae, we take radiation as constituent of the universe, the equation of motion of a particle might be (1.2) instead of (1.1). Hence, for the further development of wave geometry, it is worth while to investigate the space in which a free particle moves along the path (1.2).

§ 2. The fundamental equation for ψ.[3]

Wave geometry is based on the vector- and spin parallel displace-

(1) T. Iwatsuki, Y. Mimura, and T. Sibata, this Journal, **8** (1938), 187, (W. G. No. 27).

(2) In this paper, since we take $\overset{1}{F}_{ij} = A_{[ij]}$ and $\overset{2}{F}_{ij} = A_{[ij]_5}$, the factor 2 appears in (1.2). The term Qu^j disappears when u^j is suitably normalized.

(3) The method of finding the fundamental equation here adopted is closely analogous to T. Sibata's, this Journal **8** (1938), 199–204, (W. G. No. 29); thus the equations which are not important are omitted here. The notations used in this paper are the same as in Sibata's.