Wave Geometry No. 43

Cosmology in Terms of Wave Geometry (VIII) Observation Systems in Cosmology.

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§ 1. Introduction.

In cosmology in terms of wave geometry,[1] we have adopted the idea that a nebula has two aspects, one being that of a particle in detecting the universe, the other being of probability-existence; that is to say

(1) the path of each nebula, as a particle, is a geodesic line in the space time continuum.

(2) as a probability-existence, the momentum density of nebulae is a function of ψ, the solution of the fundamental equation.

On the basis of these considerations, with the condition that the vector $u^l=\psi^\dagger A\gamma^l\psi$ considered as expressing the momentum density vector of nebulae smeared out, always generates a geodesic line in the space-time continuum, we have established our theory.

In this paper, first we shall show that our theory of cosmology is characterized by a *homogeneous property for observations* in the universe. Next, we shall obtain the relations between two observation-systems in the universe and using these relations we shall show that the Hubble's velocity distance relation in terms of wave geometry is also deducible.

§ 2. Homogeneous property of the universe.

In cosmology in terms of wave geometry,[1] we have obtained the fundamental equation for ψ:

$$\left(\frac{\partial}{\partial x^i}-\Gamma_i\right)\psi=\frac{k}{2}\gamma_i\psi\,,\qquad (i=1,\ldots,4) \tag{2.1}$$

and, as condition for complete integrability of (2.1),

$$K_{ij}{}^{kl}=2k^2\delta^k_{[j}\delta^l_{i]}\,,\qquad (i,j,k\,l=1,\ldots,4) \tag{2.2}$$

(1) Y. Mimura and T. Iwatsuki, this Journal **8** (1938), 193, (W. G. No. 28).
T. Sibata, this Journal **8** (1938), 199, (W. G. No. 29).
H. Takeno, this Journal **8** (1938), 223, (W. G. No. 30).
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