Asymmetric Nondegenerate Geometry in the Scope of Purely Metric Conceptio n

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A class of nondegenerate nonsymmetric geometries (T-geometries) is considered. Any T-geometry may be considered to be a generalization of metric geometry, when all constraints on metric ρ are removed. Instead of metric ρ one uses the real world function $\Sigma(P,Q) = \frac{1}{2}\rho^2(P,Q)$, which satisfies only one constraint $\Sigma(P,P) = 0$. (condition of Σ-function symmetry is omitted, and geometry becomes to be asymmetric). One proves the theorem that the proper Euclidean geometry can be described in terms and only in terms of $\Sigma = \Sigma_{\mathrm{E}}$, where Σ_{E} is a special form of the world function Σ, which satisfies a series of constraints written in terms of Σ_{E}.

Any T-geometry is obtained as a result of a deformation (Σ-deformation) of the standard (proper Euclidean) geometry. Σ-deformation (a change of distances between pairs of points) is described by the Σ-function. Any geometrical relation of standard geometry is written in the σ-immanent form (i.e. in terms of Σ-function Σ_{E} and finite subspaces $\mathcal{P}^n = \{P_0, P_1, ..., P_n\} \subset \Omega$). Producing Σ-deformation (i.e. replacing in the relation Σ_{E} by Σ), one obtains corresponding relation of T-geometry in question. Such an approach admits one to go around the problem of the axiomatics construction for any T-geometry and to use axiomatics only of the standard geometry. (In principle, axiomatics of any T-geometry may be obtained as a result of Σ-deformation of the standard geometry axiomatics, but there is no necessity in such a construction, because it is very complicated for a non-uniform geometry). Mathematical technique of nonsymmetric T-geometry is developed, keeping in mind its application to the space-time model of the microcosm.

In application to the space-time geometry the Σ-function asymmetry means that the past and the future are not equivalent geometrically. Nonsymmetric T-geometry may be considered to be a symmetric one with additional metric field, generated by the antisymmetric component of the Σ-function. Influence of the additional field may be very strong. Two sorts of Christoffel symbols, two sorts of geodesics, three sorts of the first order tubes and closed timelike first order tubes appear. In application to space-time geometry of microcosm the T-geometry capacities are more powerful, than those of the Riemannian geometry.