

Algebraic characterization of differential geometric structures serge skryabin

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Abstract

We consider purely algebraic data generalizing the notion of a smooth differentiable manifold. It is given by a triple X, R, W where X is a set, R a commutative associative algebra over the ground field, W a Lie subalgebra and an \mathfrak{L} -submodule in the derivation algebra of R . Geometric structures studied in differential geometry can be defined on such triples. The main result answers the question about the existence and the uniqueness of an L -invariant unimodular, hamiltonian, contact, or pseudo-riemannian structure in terms of the isotropy subalgebras of points of X . The second major result generalizes a classical fact which says that the Lie algebra of infinitesimal automorphisms of a Riemann metric on a connected manifold is finite dimensional. © 2008 Heldermann Verlag.

Keywords

Contact structures, Hamiltonian structures, Riemann pseudometrics, Unimodular structures