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Section:

5. Differential Geometry and Global Analysis

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Connections of holonomic and non-holonomic smooth manifolds

Slebodsinsky used a decomposition formula of differential of points of smooth manifolds by basic vectors of tangent space. M. Akivis prolonged it and discovered a differential equation for the symmetric basic vectors of osculating spaces of higher orders, having assumed completeness of the differentials of the points and vectors. Vagner's differential groups with symmetric forms operates in the osculating spaces to ordinary (holonomic) smooth manifolds. Prooved by Laptev Cartan's generalized lemma gives in general non-symmetric forms, which may be used with non-symmetric vectors, refusing the completeness of the differentials. Then the smooth manifold will be called non-holonomic. Results: 1) on the non-holonomic manifold the torsion of linear (affine) connection is quasitensor, but curvature forms quasitensor only with connection object; 2) on the holonomic manifold the torsion and the curvature are tensors; 3) in both cases linear connection locally is interpreted inside osculating space of second order by projection of adjacent tangent space on the initial one in parallel to A. Rybnikov's equipped subspace.