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Title: Geometry of big-tangent manifolds

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Motivated by generalized geometry, we discuss differential geometric structures on the total space $\mathfrak{T}M$ of the bundle $TM \oplus T^*M$, where M is a differentiable manifold; $\mathfrak{T}M$ is called a big-tangent manifold. We define various lifting processes from M to $\mathfrak{T}M$. The vertical leaves of the bundle are para-Hermitian vector spaces and a big-tangent manifold is endowed with canonical presymplectic, Poisson and 2-nilpotent structures. The frame bundle structure of a big-tangent manifold is a G -structure defined by a suitable triple of structures as mentioned above, and we establish the corresponding integrability conditions. We introduce horizontal bundles and associated linear connections with the Bott property. Then, we discuss metrics on the vertical bundle that are compatible with the para-Hermitian metric of the leaves. Together with a horizontal bundle, such metrics may be seen as a generalization of the fields studied by double field theory of string physics. These generalized fields are defined over a base manifold and we define a corresponding canonical connection and an action functional.

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