

Abstract Submitted
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Einsteinian Relativity in the Tangent Bundle of Spacetime

HOWARD BRANDT, Army Research Laboratory — The tangent bundle of spacetime consists of spacetime in the base manifold and four-velocity space in the fiber [1]. The coordinates of a point in the spacetime tangent bundle are the spacetime and four-velocity coordinates of the observer. Einsteinian relativity plays a central role in the formulation of possible differential geometric structures and embedded fields in the spacetime tangent bundle. The covariant four-acceleration of Einstein's theory of general relativity plays a particularly important role. The quantum mechanics of the vacuum suggests the existence of a limiting proper acceleration, thereby placing restrictions on the differential geometric structure of the spacetime tangent bundle, and also on the structure of embedded classical and quantum fields [2-4]. In the present work, examples are addressed emphasizing the roles of both special-relativistic Lorentz invariance and general relativistic covariance in the theory of the spacetime tangent bundle.

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