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Parameterized Absolute Parallelism: A Geometry for Physical Applications

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Abstract: Absolute parallelism (AP) geometry is frequently used for physical applications. Although it is wider than the Riemannian geometry, it has two main defects. The first is that its path equation does not represent physical trajectories of any test particle. The second is the identical vanishing of its curvature tensor. The present work shows that parameterizing this geometry would solve the two problems. Furthermore, the resulting parameterized (AP)-structure is more general than both the conventional (AP)-structure and the Riemannian structure. Also, it is shown that it can be reduced to one or the other, of these two geometric structures, in some special cases. The structure obtained is more appropriate for physical applications, especially in constructing field theories gauging gravity.

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