

ON A NEW KIND OF EINSTEIN WARPED PRODUCT (POLJ)-MANIFOLD

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Abstract. We provide a possible way of constructing a new kind of Einstein warped-product manifold which we will call POLJ-manifold; if we can build the fiber-manifold as a derived-differential-manifold (i.e. the fiber-manifold can admit negative dimension), then we have an Einstein warped product manifold that may have zero dimension ($\dim B + \dim F = 0$) so the result may be an “invisible”-manifold but made up of two manifolds with 2 and -2 dimension respectively, a kind of “point-manifold” (zero dimension) with “hidden” dimensions. The POLJ-manifold could introduce a new kind of Kaluza-Klein theory with extra negative dimensional spaces, or Kaluza-Klein theory with new kind of time-manifold. In fact POLJ-manifold could describe a new nature of time.

1. Introduction and Preliminaries

The concept of negative dimensional space is already used in linguistic statistics [2]. Also in supersymmetric theories in Quantum Field Theory, negative dimensional spaces were used [3].

Let $E \cong M \times F$ be a fiber bundle with base space M and its fiber F . We will discuss now a case, where the fiber has negative dimension. Note that the total dimension of the fiber bundle is given by the relation $\dim E = \dim M + \dim F$. We will consider the case, where the base manifold has greater positive dimension than the negative dimension of the fiber, i.e. $\dim M > -\dim F$. In this case, the dimension of the total fiber bundle is still positive. Since the base manifold is obtained by projection of the fiber bundle along the fiber by projection operator π_F , we have $\pi_F E = M$ i.e. the projection of the lower-dimensional fiber-bundle along the fiber yields the higher dimensional base manifold space. Therefore, the projection operator π_F along the negative-dimensional fiber, is a suspension operator that raises the dimension of topological spaces.

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