

Complete surfaces with zero curvatures in conformally flat spaces

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Abstract. In this paper, we introduce a family of Riemannian manifolds \mathbb{E}_F^3 , which are Euclidean space \mathbb{R}^3 endowed with conformally flat metrics. We characterize rotational surfaces with constant Gaussian and extrinsic curvatures in \mathbb{E}_F^3 . We present a particular space that is isometric to $\mathbb{H}^2 \times \mathbb{S}^1$, and, using a special parametrization, we construct a family of complete rotational surfaces with zero Gaussian and extrinsic curvatures in $\mathbb{H}^2 \times \mathbb{S}^1$. We have built a special space that is a warped product $\mathbb{H}^2 \times_f \mathbb{R}$, which is a complete space foliated by complete surfaces of constant Gaussian curvature -1 ; this shows that the hyperbolic space \mathbb{H}^2 is isometrically immersed into the space $\mathbb{H}^2 \times_f \mathbb{R}$, and this space is isometric to neither \mathbb{H}^3 nor $\mathbb{H}^2 \times \mathbb{R}$, showing that in the ambient space, $\mathbb{H}^2 \times_f \mathbb{R}$ Hilbert theorem does not hold.

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