



KÄHLERIAN STRUCTURES AND \mathcal{D} -HOMOTHETIC BI-WARPING

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Abstract. We introduce the notion of \mathcal{D} -homothetic bi-warping and starting from a Sasakian manifold M , we construct a family of Kählerian structures on the product $\mathbb{R} \times M$. After, we investigate conditions on the product of a cosymplectic or Kenmotsu manifold and the real line to be a family of conformal Kähler manifolds. We construct several examples.

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1. Introduction

To study manifolds with negative curvature, Bishop and O’Neill introduced the notion of warped product as a generalization of Riemannian product [1].

In 1985, using the warped product, Oubiña showed that there is a one-to-one correspondence between Sasakian and Kählerian structures [14].

Recently, building on the work of Tanno [16] (the homothetic deformation on contact metric manifold), Blair [6] introduced the notion of \mathcal{D} -homothetic warping. He used it for generating further results and examples of various structures. In particular, he showed in another way that there is a one-to-one correspondence between Sasakian and Kählerian structures.

Here by generalizing the \mathcal{D} -homothetic warping and following what made Blair in [6], we exceed this correspondence and we show that every Sasakian manifold M generates a one-parameter family of Kählerian manifolds, thereby generalizing the results of Oubiña [14] and Blair [6]. On the other hand, we define a two-parameter family of conformally Kähler manifolds structures on the product manifold $\mathbb{I} \times M$ of an open interval and a cosymplectic or Kenmotsu manifold M (Theorem 7), which is the first main result of the present paper. This text is organized in the following way.

Section 2 is devoted to the background of the structures which will be used in the sequel.