

DUMITRU Dan, Remarks on Robertson-Walker Warped Products Equations

Abstract

The aim of this paper is to investigate, primarily small dimension, multiply generalized warped products $M = I \times_{f_1} F_1 \times_{f_2} \cdots \times_{f_m} F_m$ which are Einstein spaces, where $I = (t_1, t_2)$ is an interval with $-\infty \leq t_1 \leq t_2 \leq \infty$ and $\dim F_i = k_i \geq 1$ for every $i \in \{1, \dots, m\}$. If $M = I \times_{f_1} F_1 \times_{f_2} \cdots \times_{f_m} F_m$ we will say that M is of type $(1, k_1, \dots, k_m)$ and $\dim M = 1 + k_1 + \dots + k_m$. Thus, considering the multiply generalized Einstein warped product equations, we compute, exactly or in the parametrized form, the warping functions in the following cases:

- a) M is of type $(1, 1)$.
- b) M is of type $(1, 2)$ or $(1, 1, 1)$.
- c) M is $(1, 3)$, $[(1, 1, 2)$ and Ricci flat] or $(1, 1, 1, 1)$.
- d) M is $(1, 4)$, $(1, 1, 3)$ or $(1, 1, 1, 1, 1)$.
- e) M is $(1, \underbrace{1, 1, \dots, 1}_{p \text{ times}})$ with $p \geq 5$ or $[(1, 1, k)$ and Ricci flat] with $k \geq 4$.
- f) Equal warping function.

Keywords: Einstein space, multiply warped product, warping function.

ACM/AMS2010 Classification: 53C25, 53C50