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CR-LIGHTLIKE WARPED PRODUCT IN GOLDEN SEMI-RIEMANNIAN MANIFOLDS

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Abstract: In this research, we examine CR-lightlike submanifolds $(CRL)sub_M$ of a Golden semi-Riemannian manifold $(SR)_M$. We obtain some interesting theorems on CR-lightlike warped product (WP). We also construct an example of CR-lightlike submanifolds.

Keywords and Phrases: Golden structure, golden semi-Riemannian manifold, CR-lightlike submanifolds, totally umbilical, warped product.

2020 Mathematics Subject Classification: 53C12, 53C15, 53C22, 53C40, 53C56.

1. Introduction

The theory of CR-submanifolds of a Kaehler manifold $(\overline{Q}, q)$ was initiated by Bejancu [5], [6], as a result of generalization of holomorphic (invariant) and totally real (anti-invariant) submanifolds of Kaehler manifolds, where q is a non-degenerate metric tensor. The classical theory of Riemannian submanifolds breaks down if the induced metric tensor is degenerate because the tangent bundle and the submanifold's normal bundle are not complementary i.e. there is an intersection that is not zero. In order to solve this issue, K. L. Duggal and A. Bejancu [12] presented a few novel techniques and explored lightlike submanifolds (also see [1], [12], [15], [20]). Afterwards, research on generalized $(CRL)sub_M$s was initiated and studied in [13], [14], [22]. In [11], Duggal and Bejancu studied the lightlike CR-hypersurfaces of