

SOME RESULTS ON SUBMANIFOLDS OF A α -COSYMPLECTIC MANIFOLD WITH TORQUED VECTOR FIELD

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Abstract: In this paper, we examine a submanifold N of an α -cosymplectic manifold equipped with a torqued vector field τ . We also investigate submanifolds that admit a $*\eta$ -Ricci soliton within the framework of α -cosymplectic manifolds with torqued vector field τ . We establish the necessary conditions for such a submanifold to reduce to a simpler form and demonstrate that the tangential component of τ acts as a torse-forming vector field on N . Finally, we present an example of a 3-dimensional submanifold of a 5-dimensional α -cosymplectic manifold which verifies our results.

Keywords and Phrases: α -cosymplectic manifold, $*\eta$ -Ricci soliton, Torqued vector field.

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1. Introduction

The study of manifolds is highly regarded by geometers and physicists for its broad applications in geometry, physics, and relativity. By examining manifolds, geometers have utilized two essential tools-the Riemannian curvature tensor and the Ricci tensor-to understand their differential geometric properties. Over time, these tools have enabled the introduction of several new concepts to describe complex structures. One such concept is the $*$ -Ricci tensor S^* , initially introduced by