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A STUDY ON $(\mathcal{L}cs)_n$-MANIFOLDS INDUCED WITH $\mathcal{SVK}$-CONNECTION

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Abstract: The present paper aims to define and discuss $(\mathcal{L}cs)_n$-manifolds and Schouten van Kampen connection. We discussed the curvature tensor and Ricci curvature tensor of this manifold with respect to the $\mathcal{SVK}$-connection. We studied conformally flat, projectively flat, conharmonically flat, and concircularly flat $(\mathcal{L}cs)_n$-manifolds with the $\mathcal{SVK}$-connection. At last, we gave an example of $(\mathcal{L}cs)_n$-manifolds with $\mathcal{SVK}$-connection.

Keywords and Phrases: $(\mathcal{L}cs)_n$-manifold, $\mathcal{SVK}$-connection.

2020 Mathematics Subject Classification: 53C15, 53C20.

1. Introduction

In 1989, K. Matsumoto [6] introduced the notion of Lorentzian para-Sasakian manifolds and the generalization of LP-Sasakian manifolds. Lorentzian concircular structure manifolds (shortly, $(\mathcal{L}cs)_n$-manifolds) were introduced in 2003 by A. A. Shaikh [9]. In 2005 and 2006, Shaikh and Baishya [10], [11] investigated the application of $(\mathcal{L}cs)_n$-manifolds to the general theory of relativity and cosmology. $(\mathcal{L}cs)_n$-manifolds are also studied by Atceken et al ([1], [2]), D Narain and S, Yadav [13].

The $\mathcal{SVK}$-connection, endowed with an affine connection, is one of the most natural connections adapted to a pair of distributions on a differentiable manifold [3], [8]. Solov'ev [12] investigated hyperdistributions in Riemannian manifolds using the $\mathcal{SVK}$-connection. Then, Zbigniew Olszak [7] studied the Schouten-van Kampen