

Algorithms for Intelligent Systems

Series Editors: Jagdish Chand Bansal · Kusum Deep · Atulya Nagar

Atul Chaturvedi
Bimal Kumar Roy
Boaz Tsaban *Editors*

Mathematics and Logics in Computer Science

Proceedings of ICMLCS 2025



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Algorithms for Intelligent Systems

Series Editors

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Non-Invariant Hypersurfaces of Quasi-Para-Sasakian Manifolds

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Abstract. In this research paper, we analyze a non-invariant hypersurfaces of a quasi-para-Sasakian manifold with (f, g, u, v, λ) -structure. The paper is divided into two sections. In the first section the properties of non-invariant hypersurfaces of a quasi-para-Sasakian manifold with (f, g, u, v, λ) -structure are discussed. In second section, the necessary and sufficient condition for totally umbilical non-invariant hypersurfaces equipped with (f, g, u, v, λ) -structure of a quasi-para-Sasakian manifold to be totally geodesic has been explored.

Keywords: Quasi-para-Sasakian manifold · Non-invariant hypersurfaces · Totally geodesic and totally umbilical

Mathematics Subject Classification: 2000 · 53C15 · 53C25 · 53C40

1 Introduction

Quasi Sasakian structures was introduced by Blair [2] in 1969, who also investigated hypersurfaces in almost contact manifolds [1]. In 2023, S. K. Mishra et al. [15] examined Quasi-Para-Sasakian Manifolds with Zamkovoy Connection. The concept of non-invariant hypersurfaces was proposed by Goldberg and Yano in 1970 [6]. Yano and Okumura [7, 8] later defined a (f, g, u, v, λ) – structure, referring to it as a non-invariant hypersurface within an almost contact metric manifold. U. C. De, Yauling Han, and K. Mandal [4] conducted studies on para-Sasakian manifolds under specific curvature conditions. In a separate work, it was shown that a (f, g, u, v, λ) – structure can always be found on non-invariant hypersurfaces of almost contact metric manifolds [5]. R. Prasad [9] explored non-invariant hypersurfaces in trans-Sasakian manifolds, while Ahmed et al. [10] investigated them in nearly hyperbolic Sasakian manifolds. Khan and colleagues [11–13] studied non-invariant hypersurfaces across various manifold structures.

This paper is organized as follows: Sect. 2 provides a brief overview of quasi-para-Sasakian manifolds. In Sect. 3, we introduce the non-invariant hypersurfaces of quasi-para-Sasakian manifolds and derive the (f, g, u, v, λ) – structure on these hypersurfaces,