

## $\eta$ -RICCI YAMABE SOLITONS ON PSEUDO-PROJECTIVE FLAT LP-SASAKIAN SPACE-TIME MANIFOLD

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**Abstract.** In this paper, we examine  $\eta$ -Ricci Yamabe solitons on Pseudo-projective flat LP-Sasakian space-time manifolds. We have discussed different conditions for Ricci Yamabe solitons to be steady, shrinking or expanding in terms of isotropic pressure, the cosmological constant, energy density and gravitational constant in different perfect fluids such as dark fluid, Stiff matter, dust fluid and radiation fluid.

**Keywords.** Ricci Yamabe Soliton,  $\eta$ -Ricci Yamabe Soliton, LP-Sasakian Manifold, Pseudo-Projective Tensor.

**AMS (MOS) subject classification:** 53D10, 53D15, 53D99.

## 1 Introduction

In 1989, K. Matsumoto [14] introduced the notion of LP-Sasakian manifold and it has been studied by many authors [7, 13, 18]. In 1988, Hamilton [10] initiated the notion of Ricci flow and Yamabe flow concurrently. The solution to the Ricci flow and Yamabe flow are known as Ricci soliton and Yamabe soliton respectively. Some related works can be found in [1, 3, 8, 15, 16, 20, 21, 24–33]. Currently, Güler and Crasmareanu [9] initiated the study of a new geometric flow which is a scalar combination of Ricci flow and Yamabe flow

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