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ON HYPERBOLIC KENMOTSU MANIFOLDS WITH THE GENERALIZED SYMMETRIC METRIC CONNECTION

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Abstract: In this paper, we define Hyperbolic Kenmotsu manifolds and the generalized symmetric metric connection on this manifold. Further we discuss curvature tensor and Ricci curvature tensor with respect to the generalized symmetric metric connection. We also study Ricci semi-symmetric 3-dim Hyperbolic Kenmotsu manifold with the generalized symmetric metric connection and Projectively flat manifold with respect to the generalized symmetric metric connection.

Keywords and Phrases: Hyperbolic Kenmotsu manifold, Generalized symmetric metric connection.

2020 Mathematics Subject Classification: 53C15, 53C20.

1. Introduction

A linear connection $\bar{\nabla}$ is said to be the generalized symmetric metric connection if its torsion tensor T is of the form

$$T(X,Y) = \alpha\{\eta(Y)X - \eta(X)Y\} + \beta\{\eta(Y)\phi X - \eta(X)\phi Y\}, \tag{1.1}$$

for any vector fields X, Y on a manifold, where α and β are smooth functions. ϕ is a tensor of type (1,1) and η is a 1-form associated with a non-vanishing smooth non-null unit vector field ξ. Moreover, the connection $\bar{\nabla}$ is said to be the generalized symmetric metric connection if there is a Riemannian metric g in M such that $\bar{\nabla}g = 0$, otherwise it is non metric.