South East Asian J. of Mathematics and Mathematical Sciences
Vol. 18, No. 3 (2022), pp. 161-170

DOI: 10.56827/SEAJMMS.2022.1803.13 **ISSN (Online): 2582-0850**

ISSN (Print): 0972-7752

ON RECURRENT LIGHTLIKE HYPERSURFACE OF KENMOTSU MANIFOLD

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(**Received:** *Aug. 30, 2021* **Accepted:** *Nov. 28, 2022* **Published:** *Dec. 30, 2022)*

Abstract: The object of present paper is to study the properties of recurrent lightlike hypersurfaces of Kenmotsu manifold with $(\ell, m)-$type connection.

Keywords and Phrases: Hypersurfaces, Kenmotsu manifold, Recurrent lightlike hypersurfaces.

2020 Mathematics Subject Classification: 53C15, 53C25.

1. Introduction

A linear connection $\overline{\nabla}$ on a semi-Riemannian manifold $(\overline{M}, \overline{g})$ is called an $(\ell, m)-$type connection [7] if $\overline{\nabla}$ and its torsion tensor $\overline{T}$ satisfy

$$\begin{aligned}(\overline{\nabla}_{\overline{X}}\overline{g})(\overline{Y},\overline{Z}) &= \ell\{\theta(\overline{Y})\overline{g}(\overline{X},\overline{Z}) + \theta(\overline{Z})\overline{g}(\overline{X},\overline{Y}) \\ &\quad - m\{\theta(\overline{Y})\overline{g}(J\overline{X},\overline{Z}) + \theta(\overline{Z})\overline{g}(J\overline{X},\overline{Y}) \qquad (1.1)\end{aligned}$$

and

$$\overline{T}(\overline{X},\overline{Y}) = \ell\{\theta(\overline{Y})\overline{X} - \theta(\overline{X})Y\} + m\{\theta(\overline{Y})J\overline{X} - \theta(\overline{X})J\overline{Y}\}, \qquad (1.2)$$

where ℓ and m are two smooth functions on $\overline{M}$, J is a tensor field of type $(1,1)$ and θ is a 1-form associated with a smooth unit vector field ζ which is called the characteristic vector field of $\overline{M}$, given by $\theta(\overline{X}) = \overline{g}(\overline{X}, \zeta)$. By direct calculation it