A Flat $(CHR)_3$-curvature tensor in a Trans-Sasakian Manifold

Koji Matsumoto

(Yamagata University, 2-3-65 Nishi-Odori, Yonezawa, Yamagata, 992-0059, Japan)

E-mail: `tokiko_matsumoto@yahoo.com`

Recently, we defined a $(CHR)_3$-curvature tensor in almost contact Riemannian manifolds([3]) using M. Prvanovic's paper ([4]).

On, 2009, A. A. Shaikh and Y. Matsuyama considered a trans-Sasakian manifold which is a generalization of a Kenmotsu and Sasakian manifold and got some interesting results([5]).

In this paper, we consider this tensor field in a trans-Sasakian manifold. Moreover, we define the notion of the $(CHR)_3$-flatness in an almost contact Riemannian manifold. Then, we consider this notion in a trans-Sasakian manifold and determine the curvature tensor, the Ricci tensor and the scaler curvature. Finally, we get a condition which the Ricci tensor becomes a generalized quasi- or quasi-Einstein ([1], [2]).

References

[1] M. C. Chaki, On generalized quasi-Einstein manifolds, *Publ. Math. Debrecen,* **58** (2001), 683 – 691.

[2] M. C. Chaki and R.K. Maity, On quasi-Einstein manifolds, *Publ. Math. Debrecen,* **57** (2000), 297 – 306.

[3] K. Matsumoto, A new curvaturelike tensor field in an almost contact Riemannian manifold II, to appear.

[4] M. Prvanovic, Conformally invariant tensors of an almost Hermitian manifold associated with the holomorphic curvature tensor, *J. Geom.* **103** (2012), 89-101.

[5] A. A. Shaikh and Y. Matsuyama, On trans-Sasakian manifolds, *Sut J. of Mathematics,* **45**, No. 1 (2009), 25 – 41.