A New Curvaturelike Tensor Field in an Almost Contact Riemannian Manifold II

Koji Matsumoto

Yamagata University, Yamagata, JAPAN
[tokiko_matsumoto@yahoo.com]

In the last paper, we introduced a new curvaturelike tensor field in an almost contact Riemannian manifold and we showed some geometrical properties of this tensor field in a Kenmotsu and a Sasakian manifold [4].

In this talk, we define another new curvaturelike tensor field, named $(CHR)_2$-curvature tensor in an almost contact Riemannian manifold which is called a contact holomorphic Riemannian curvature tensor of the second type (See (2.2)). Then, using this tensor, we mainly research $(CHR)_2$-curvature tensor in a Kenmotsu and Sasakian manifold. Then we introduce the notion of the flatness of a $(CHR)_2$-curvature tensor and we show that a Kenmotsu and a Sasakian manifold with a flat $(CHR)_2$-curvature tensor is flat. Next, we introduce the notion of $(CHR)_2$-$\eta$-Einstein in an almost contact Riemannian manifold. In particular, we show that a Kenmotsu or Sasakian $(CHR)_2$-$\eta$-Einstein manifold is $\eta$-Einstein. Moreover, we define the notion of $(CHR)_2$-space form and consider this in a Kenmotsu and a Sasakian manifold. Finally, we consider a conformal transformation of an almost contact Riemannian manifold and we get new invariant tensor fields (not the conformal curvature tensor) under this transformation.
