



A generalization of contact metric manifolds

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Abstract

We consider quasi contact metric manifolds and give a necessary and sufficient condition for a quasi contact metric manifold, to be contact metric manifold and K -contact, then we prove that a quasi contact metric manifold is not nearly cosymplectic.

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1 Introduction

A quasi Kähler manifold (see[2]) is an almost Hermitian manifold (M, J, g) , that the Levi-Civita connection satisfies:

$$(\nabla_X^J)Y + (\nabla_{JX}^J)JY = 0, \quad X, Y \in \tau(M).$$

A quasi contact metric manifold was primary introduced by Y. Tashiro ([4]) as hypersurface of a quasi Kähler manifold, and named O^* -manifold by him. Then J. H. Kim and his colleagues gave a characterization of a contact metric manifold as a special almost contact metric manifold and discussed an almost contact metric manifold which is a natural generalization of the contact metric manifolds introduced by Y. Tashiro and proved that ([3]) an almost contact metric manifold (ϕ, ξ, η, g) is a quasi contact metric manifold if and only if it satisfies the following relation:

$$(\nabla_X^\varphi)Y + (\nabla_{\varphi X}^\varphi)\varphi Y = 2g(X, Y)\xi - \eta(Y)(X + \eta(X)\xi + hX)$$

in which $h = \frac{1}{2}L_\xi\varphi$.

In this paper we consider conditions on quasi contact metric manifolds, endowed with which, being contact and K -contact. Also we show that quasi contact metric manifolds can not be nearly cosymplectic.

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