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ON AUTOMORPHISM GROUPS OF SOME CONTACT RIEMANNIAN MANIFOLDS

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1. Introduction. Recently Dr. S. Tanno offered the author a conjecture that the dimension of the automorphism group of a contact Riemannian manifold of dimension $2n+1$ will not exceed $(n+1)^2$. It has been proved that the unit sphere S^{2n+1} with the standard Sasakian structure has the automorphism group of dimension $(n+1)^2$. ([3]). In this paper, we shall examine the conjecture for some kinds of contact Riemannian manifolds. Especially, we shall prove that the dimension of the automorphism group of Euclidean space E^{2n+1} with its standard contact metric structure is just $(n+1)^2$.

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2. Expressions in adapted local coordinate systems. A differentiable manifold M of dimension $2n+1$ is called a contact Riemannian manifold, [2], if it admits a vector field ξ, a 1-form η, a 1-1 tensor field Φ and a Riemannian metric G such that

$$\eta(\xi) = 1, \tag{2.1}$$

$$\Phi^2 + 1 = \xi \otimes \eta, \tag{2.2}$$

$$G(\xi, X) = \eta(X), \tag{2.3}$$

$$G(\Phi X, \Phi Y) = G(X, Y) - \eta(X)\eta(Y), \tag{2.4}$$

$$G(X, \Phi Y) = d\eta(X, Y) = \frac{1}{2}\{X\eta(Y) - Y\eta(X) - \eta[X, Y]\}, \tag{2.5}$$

where X and Y are vector fields.

Let M be a contact Riemannian manifold of dimension $2n+1$ with ξ, η, Φ and G. A vector field X on M is called an infinitesimal automorphism if

$$L_X\eta = 0 \tag{2.6}$$

and