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A REMARK ON FOLIATIONS ON A COMPLEX PROJECTIVE SPACE WITH COMPLEX LEAVES

Dedicated to Professor Hisao Nakagawa on his sixtieth birthday

By

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Introduction.

Let $\mathcal{F}$ be a foliation on a Riemannian manifold M. The distribution on M which is defined to be orthogonal to $\mathcal{F}$ is said to be normal to $\mathcal{F}$ and denoted by $\mathcal{F}^{\perp}$.

Nakagawa and Takagi [8] showed that any harmonic foliation on a compact Riemannian manifold of non-negative constant sectional curvature is totally geodesic if the normal distribution is minnimal. And succesively the present author [2] proved a complex version of their result, that is, the above result holds also on a complex projective space with a Fubini-Study metric. However, recently, Li [4] pointed out a serious mistake in the proof of the result of Nakagawa and Takagi, and so of the author's. Therefore those results are now open yet.

On the other hand, Li [4] have studied a harmonic foliation on the sphere along the method of Nakagawa and Takagi, and obtained some interesting results.

The purpose of this paper is to give a complex analogue of the Li's results. Let $\boldsymbol{P}_{n+p}(\boldsymbol{C})$ be the complex projective space with the Fubini-Study metric of constant holomorphic sectional curvature c. Let $\mathcal{F}$ be a complex foliation on $\boldsymbol{P}_{n+p}(\boldsymbol{C})$ with q-complex codimention and h the second fundamental tensor of $\mathcal{F}$. Then we shall prove the following;

THEOREM. *If the normal distribution $\mathcal{F}^{\perp}$ is minimal, we have*

$$\int_{P_{n+p}(C)} S\left\{\left(2-\frac{1}{2p}\right)S-\frac{n+2}{2}c\right\}*1\geqq 0,$$

where S denotes the square of the length of h and $*1$ the volume element of $\boldsymbol{P}_{n+p}(\boldsymbol{C})$.

COROLLARY. *Under the condition of the above theorem,*

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