

# ON PSEUDO-UMBILICAL SURFACES WITH NONZERO PARALLEL MEAN CURVATURE VECTOR IN $CP^3(\tilde{c})$

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Abstract. Any pseudo-umbilical surface with nonzero parallel mean curvature vector in  $CP^3(\tilde{c})$  is a totally real isotropic surface in  $CP^3(\tilde{c})$ .

## 1. INTRODUCTION

Let  $CP^m(\tilde{c})$  be a complex  $m$ -dimensional complex projective space with the Fubini-Study metric of constant holomorphic sectional curvature  $\tilde{c}$ .

Chen and Ogiue [1] classified totally umbilical submanifolds in  $CP^m(\tilde{c})$ . However, it is well known that the class of pseudo-umbilical submanifolds in  $CP^m(\tilde{c})$  is too wide to classify. Thus, it is reasonable to study pseudo-umbilical submanifolds in  $CP^m(\tilde{c})$  under some additional condition.

Recently, the author proved that any pseudo-umbilical submanifold  $M^n$  with nonzero parallel mean curvature vector in  $CP^m(\tilde{c})$  is a totally real submanifold and satisfies  $2m > n$  ([3]). Thus, we see that  $CP^2(\tilde{c})$  admits no pseudo-umbilical surfaces with nonzero parallel mean curvature vector.

In the previous paper [4], the author showed that any complete pseudo-umbilical isotropic surface of  $P(\mathbb{R})$ -type (see Preliminaries) with nonzero parallel mean curvature vector in  $CP^4(\tilde{c})$  is an extrinsic hypersphere in a 3-dimensional real projective space  $RP^3(\tilde{c}/4)$  of  $CP^3(\tilde{c})$ .

The aim of this paper is to prove the following result.