

## Indefinite Anti-Invariant Submanifolds of An Indefinite Complex Space Form

Augustus N. Wali

*Department of Applied Mathematics,  
Kigali Institute of Science and Technology, B.P.3900 Kigali, Rwanda  
E-mail: nzomoa@yahoo.com*

### Abstract

The geometry of anti-invariant submanifolds of a complex space form with positive definite metric was studied by Chen-Ogiue [2], Yano-Kon [6] and others. In this paper we study the geometry of indefinite anti-invariant submanifolds of an indefinite complex space. We found that if the submanifold is a timelike, spacelike or mixedlike totally geodesic then it is an Einstein submanifold. Moreover, if the submanifold is a proper indefinite anti-invariant Einstein submanifold then it is a totally geodesic submanifold of constant curvature  $\frac{c}{4}$ .

**Keywords:** Anti-invariant submanifold, Complex space form, Totally geodesic.

### Introduction

Let  $\bar{M}_{s+t}^{n+p}(c)$ ,  $c \neq 0$  be an indefinite complex space form of holomorphic sectional curvature  $c$ ,  $\dim_{\mathbb{R}} \bar{M} = 2n + 2p$  and index  $= 2s + 2t$ , with  $0 \leq s \leq n$  and  $0 \leq t \leq p$ . Let  $J$  be the almost complex structure and  $g$  the metric tensor of  $\bar{M}_{s+t}^{n+p}(c)$  given by

$$g(X, Y) = -\sum_{i=1}^{s+t} X_i Y_i + \sum_{j=s+t+1}^{n+p} X_j Y_j \quad (1.1)$$

Let  $M_s^n$  be a  $2n$ -dimensional indefinite anti-invariant submanifold of index  $2s$  immersed in  $\bar{M}_{s+t}^{n+p}(c)$ . A submanifold  $M$  of a Kaehler manifold is called anti-invariant if each tangent space of  $M$  is mapped into itself by the almost complex structure of the Kaehler manifold [2]. A Kaehler manifold of constant holomorphic