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Submersion of CR-Submanifolds of Locally Conformal Kaehler Manifold

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Abstract. In this paper, we discuss submersion of CR-submanifolds of locally conformal Kaehler manifold. We prove that if $\pi : \overline{M} \longrightarrow B_\circ$ is a submersion of CR-submanifold M of a locally conformal Kaehler manifold $\overline{M}$ onto an almost Hermitian manifold $B_\circ$, then $B_\circ$ is a locally conformal Kaehler manifold. Furthermore, we discuss totally umbilical CR-submanifold and cohomology of CR-submanifold of locally conformal Kaehler manifold under the submersion.

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1. Introduction

A Hermitian manifold $(\overline{M}, g)$ is called a *locally conformal Kaehler manifold (briefly l.c.K manifold)*, if every point of $\overline{M}$ has a neighborhood U such that the restriction g_U of g to U is conformal to a Kaehler metric g'_U of $U : g_U = e^{\sigma_U} g'_U$ for some c^∞ function $\sigma_U : U \longrightarrow \mathbb{R}$. $(\overline{M}, g)$ is a globally conformal Kaehler (g.c.K) manifold if one can choose $U = \overline{M}$; then g' is a Kaehler metric on $\overline{M}$, and hence $(\overline{M}, g')$ is a Kaehler manifold.

Let Ω be a 2-form on $\overline{M}$. Then $\overline{M}$ is a l.c.K. manifold if and only if there is a global 1-form ω on $\overline{M}$ (the Lee form of $\overline{M}$) such that [15]

$$d\Omega = \omega \wedge \Omega, \qquad d\omega = 0, \tag{1.1}$$