

ALMOST PARACONTACT AND PARAHODGE STRUCTURES ON MANIFOLDS

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§0. Introduction

In this paper we study the paracomplex analogues of almost contact structures, and we introduce and study the notion of *parahodge structures* on manifolds. In particular, we construct new examples of paracomplex manifolds and we find all simply connected parahermitian symmetric coset spaces, which are the adjoint orbits of noncompact simple Lie groups, with parahodge structures induced by the Killing forms. This is done by (i) observing that a version of the results of A. Morimoto [4] on almost contact structures can be formulated and proved for *almost paracontact structures*, and by (ii) the methods of geometric quantization [3] applied to parahermitian symmetric triples [1] in conjunction with results of [7]. Two of the main results are Theorem 2.5 (which ties together the above structures) and Corollary 3.9.

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NOTATIONS.

- \mathbf{R}^+ the group of positive real numbers,
- id the identity mapping,
- e the unit element of a group,
- G^0 the identity component of a Lie group G ,
- $\mathfrak{X}(M)$ the Lie algebra of all smooth vector fields on a manifold M .

The Lie algebra of a Lie group G is denoted by the corresponding German small letter \mathfrak{g} and also by $\text{Lie } G$.

§1. Almost paracontact structures

DEFINITION 1.1. *Let M be a $2n + 1$ dimensional smooth manifold. Let*

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