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VECTOR FIELDS OF A FINITE TYPE G-STRUCTURE

A. M. AMORES

0. Introduction

Let M be a connected manifold, g a Riemannian metric on M, and $\mathcal{F}$ either the set of Killing vector fields or the set of conformal vector fields. The following theorems are known.

(0.1) Theorem. *If $U \subset M$ is open and $X, Y \in \mathcal{F}$, then $X|U = Y|U$ implies $X = Y$ on the whole of M.*

(0.2) Theorem. *If M and g are analytic, M is simply connected, and X is a Killing (resp. conformal) field on U, open subset of M, then there is a unique extension of X to an analytic Killing (resp. conformal) field defined on the whole of M.*

These theorems were proved in [4] for the Killing case and in [3] for the conformal case. The aim of this paper is to generalize them, when $\mathcal{F}$ is taken to be set of vector fields of a finite type G-structure. The precise definitions and statements of the theorems are in §2 and §3. §4 is devoted to proving some auxiliary results on fields on a parallelisable manifold. When no precision is made about the differentiability class of a manifold or map, it will be understood that the definition or result works for both the category of manifolds of class infinity and real analytic manifolds.

1. Parallelism fields

Let $m = \dim M$, and π be a parallelism on M; that is, a 1-exterior form on M with values in R^m such that for all $x \in M$, $\pi(x) : TM(x) \to R^m$ is an isomorphism. Suppose that X is a vector field on M, and $\{\psi_t : t \in R\}$ the corresponding pseudogroup of diffeomorphisms. Then we say that X is a parallelism field if for all $t \in R$, $\psi_t^* \pi = \pi$, or, equivalently, if $L_X \pi = 0$. Let $(u^1, \cdots, u^m)$ be a coordinate system on U. If X is a field on U and $c: I \to U$

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