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μ-EXPANSIVE MEASURE FOR FLOWS

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Abstract. In this paper, we show that if X is in the C^1-interior of the set of μ-measure expansive divergence free vector fields, then X admits a dominated splitting. We also show that in dimension 3, the above result would be Anosov by considering δ-μ-measure expansiveness.

1. Introduction

Let M be a closed, connected, and smooth Riemannian manifold endowed with a volume form, which has a measure μ, called the Lebesgue measure. We denote by $\mathcal{X}^1_\mu(M)$, the set of divergence-free vector fields endowed with the C^1 Whitney topology.

Let $X \in \mathcal{X}^1_\mu(M)$ and let $x \in M$ be a regular point. Let $N_x = X(x)^\perp \subset T_xM$ denote the normal bundle of X at x.

We define the *linear Poincaré flow*

$$P^t_X(x) := \sqcap_{X^t(x)} \circ D_xX^t,$$

where $\sqcap_{X^t(x)} : T_{X^t(x)}M \longrightarrow N_{X^t(x)}$ is the canonical orthogonal projection.

A vector field X has an associated flow, denoted by X^t, $t \in \mathbb{R}$. Denote by Sing(X) the union of the singularities of X and by Crit(X) the set of the closed orbits and the singularities of X. For $x \in X$, the set $O_X(x) = \{X^t(x) : t \in \mathbb{R}\}$ is said to be the orbit of X^t through the point x.

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