

Hodge cohomology of foliated boundary metrics

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Date / Time / Location: Thu. April 26, 2012, 1:00 - 2:00, JD35.

Abstract:

The Hodge theorem for compact manifolds without boundary states that the space of harmonic differential forms is naturally isomorphic to the singular cohomology. This talk will be about a generalization of this theorem to non-compact Riemannian manifolds whose structure outside of a compact set can be described loosely as that of a foliation crossed with $[0, \infty)$ for which the leaves of the foliation are shrinking at a precise rate as you go to infinity, at least with respect to the size of the base of the foliation. We will make this precise in the talk, but some noteworthy examples are spaces which look asymptotically like 1) a cylinder or a disjoint union of cylinders, 2) \mathbb{R}^n crossed with a closed manifold, or 3) some gravitational instantons, if you know about those.

Following the work of many previous authors, we identify the harmonic forms on the manifolds alluded to above with a topological invariant related to the intersection cohomology of a singular space made by compactifying the original manifold in a specific way related to the foliation.

I will begin the talk with a review of the Hodge theorem and some of the proof for those who have not seen these or have not seen them enough.

This is joint work with Frederic Rochon.