Hard Lefschetz Theorem for Sasakian manifolds

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Abstract

It is well known that in any compact Kähler manifold the exterior multiplication by suitable powers of the symplectic form induces isomorphisms between the de Rham cohomology spaces of complementary degrees. This is the content of the celebrated Hard Lefschetz Theorem [2, 3]. In my talk I will present recent joint work with B. Cappelletti Montano and I. Yudin [1] showing the existence of similar isomorphisms for compact Sasakian manifolds. We prove that such isomorphisms are independent of the choice of any compatible Sasakian metric on a given contact manifold. As a consequence, we find an obstruction for a contact manifold to admit compatible Sasakian structures.

References

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[2] S. Lefschetz, *L'analysis situs et la géométrie algébrique*, Gauthiers-Villars, Paris, 1924.

[3] W. V. D. Hodge, *The theory and applications of harmonic integrals*, 2nd ed., Cambridge University Press, London, 1952.