



Seminario de Geometría y Topología

Cohomological aspects in complex non-Kähler geometry

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Abstract. Besides the Dolbeault cohomology, the *Bott-Chern and Aeppli cohomologies* are further cohomological invariants for complex manifolds, and provide further tools in *non-Kähler geometry*.

On complex manifolds, we consider the cohomological property of satisfying the $\partial\bar{\partial}$ -*Lemma*, namely, the property that the Bott-Chern and the de Rham cohomologies are naturally isomorphic. In particular, we are interested in its behaviour under *deformations* of the complex structure. Firstly, we study several tools for explicitly computing the Bott-Chern cohomology for some special class of *nilmanifolds and solvmanifolds*. On the one side, such examples suggest an *inequality à la Frölicher* between the dimensions of the Bott-Chern cohomology and the Betti numbers, giving also a characterization of the $\partial\bar{\partial}$ -*Lemma*. As a corollary, we provide an argument for studying the $\partial\bar{\partial}$ -*Lemma* under small deformations. On the other side, concrete counter-examples for studying the behaviour at the limit can be explicitly investigated.

We will present results obtained in joint works with: A. Tomassini, H. Kasuya, F. A. Rossi, M. G. Franzini, S. Calamai.

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