Dolbeault and Bott-Chern harmonic forms on almost-Hermitian manifolds

Nicoletta Tardini

Parma

On a complex manifold X the exterior derivative d decomposes as the sum of two differential operators, namely $d = \partial + \overline{\partial}$ satisfying $\partial^2 = 0$, $\overline{\partial}^2 = 0$ and $\partial\overline{\partial} + \overline{\partial}\partial = 0$. Once an Hermitian metric on X is fixed one can define several natural elliptic differential operators, e.g., the Dolbeault Laplacian $\Delta_{\overline{\partial}}$ and the Bott-Chern Laplacian Δ_{BC}; if X is compact the kernel of such operators has a cohomological interpretation, i.e., it is isomorphic to the Dolbeault and Bott-Chern cohomology of X, respectively. If we do not assume the integrability of the almost-complex structure, i.e., (X, J) is an almost-complex manifold, $\Delta_{\overline{\partial}}$ and Δ_{BC} are still well-defined and elliptic but they have no more a cohomological meaning. In particular, the dimension of their kernels depends on the metric. We will discuss some results concerning such operators and the associated spaces of harmonic forms on compact almost-Hermitian manifolds. These are joint works with Andrea Cattaneo, Riccardo Piovani and Adriano Tomassini.