

S^1 -equivariant Index theorems and Morse inequalities on complex manifolds with boundary

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Abstract

Let M be a complex manifold of dimension n with smooth connected boundary X . Assume that \overline{M} admits a holomorphic S^1 -action preserving the boundary X and the S^1 -action is transversal and CR on X . The $\bar{\partial}$ -Neumann Laplacian on M is transversally elliptic and as a consequence, the m -th Fourier component of the q -th Dolbeault cohomology group $H_m^q(\overline{M})$ is finite dimensional, for every $m \in \mathbb{Z}$ and every $q = 0, 1, \dots, n$. This enables us to define $\sum_{j=0}^n (-1)^j \dim H_m^j(\overline{M})$ the m -th Fourier component of the Euler characteristic on M and to study large m -behavior of $H_m^q(\overline{M})$. In this talk, we will present an index formula for $\sum_{j=0}^n (-1)^j \dim H_m^j(\overline{M})$ and Morse inequalities for $H_m^q(\overline{M})$. This talk is based on a joint work with Chin-Yu Hsiao, Rung-Tzung Huang and Guokuan Shao.