ANALYTIC DISCS, PLURISUBHARMONIC HULLS, AND NON-COMPACTNESS OF THE $\overline{\partial}$-NEUMANN OPERATOR

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ABSTRACT. This is a joint work with Emil Straube. We show that a complex manifold M in the boundary of a smooth bounded pseudoconvex domain Ω in $\mathbb{C}^n$ is an obstruction to compactness of the $\overline{\partial}$-Neumann operator on Ω, provided that at some point of M, the Levi form of $b\Omega$ has the maximal possible rank $n-1-dim(M)$ (i.e. the boundary is strictly pseudoconvex in the directions transverse to M). In particular, an analytic disc is an obstruction, provided that at some point of the disc, the Levi form has only one zero eigenvalue (i.e. the eigenvalue zero has multiplicity one). We also show that a boundary point where the Levi form has only one zero eigenvalue can be picked up by the plurisubharmonic hull of a set only via an analytic disc in the boundary.

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