

FRG Harmonic Analysis Seminar

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$L^p$ boundedness of the Bergman projection on worm domains (Part 1 of 2)

Abstract: A central question in analysis of several complex variables is whether a biholomorphic mapping between two smoothly bounded pseudoconvex domains always extends to a $C^\infty$ diffeomorphisms of the boundaries.

In order to answer this question, Bell proved that if the Bergman projection of one of two domains preserves the space of functions that are $C^\infty$ up to the boundary, then the answer is positive. This mapping property is equivalent to the $\bar{\partial}$-Neumann problem being hypoelliptic up to the boundary.

Christ showed that, on the Diederich-Fornaess worm domain, the $\bar{\partial}$-Neumann problem is not hypoelliptic up to the boundary.

In this work, in collaboration with Steven Krantz, we obtain the asymptotic expansion for the Bergman kernel of a class of domains that can be use to exhaust the Diedrich-Fornaess worm domain. We obtain the exact range of $p$’s for which the Bergman projection is $L^p$ bounded.

In this talk I will try to illustrate the problem, the connections between this kind of analysis, the geometry of boundaries in $C^n$, regularity of solutions of boundary value problems and the boundedness of the Bergman projection.

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110 Mathematical Sciences
4:00 p.m.-4:50 p.m.