

Regularity of $\bar{\partial}$ on pseudoconvex domains in \mathbb{C}^2

Darius Ehsani

Hochschule Merseburg, Germany
dehsani.math@gmail.com

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Let $\Omega \subset\subset \mathbb{C}^2$ be a smoothly bounded weakly pseudoconvex domain. We discuss the regularity of the solution to the $\bar{\partial}$ -equation on Ω , i.e. we look to solve $\bar{\partial}u = f$ for $f \in W_{(0,1)}^s(\Omega)$. A result of Barrett shows that the canonical solution cannot always be used when one is looking for a solution in $W^s(\Omega)$.

We construct a solution operator which does exhibit regularity. Define the space $A_{(0,1)}^s(\Omega) = W_{(0,1)}^s(\Omega) \cap \ker \bar{\partial}$ and assign to it the norm from $W_{(0,1)}^s(\Omega)$. Our main result is the existence of a solution operator K such that $\bar{\partial}Kf = f$ for all $f \in A_{(0,1)}^s(\Omega)$ and

$$K: A_{(0,1)}^s(\Omega) \rightarrow W^{s+1/2}(\Omega).$$

for all $s \geq 0$.