1093-32-291 **Marco M Peloso*** (`peloso@uark.edu`), Department of Mathematical Sciences, University of Arkansas, Fayetteville, AR 72701. *Bergman kernel and projection for the unbounded worm domain.*

This work is in collaboration with S. Krantz and C. Stoppato.

We wish to study the Bergman kernel and projection on the unbounded worm

$$\mathcal{W}_\infty = \Big\{(z_1, z_2) \in \mathbf{C} \times \mathbf{C}^* : \Big|z_1 - e^{i \log |z_2|^2}\Big| < 1\Big\},$$

where $\mathbf{C}^* = \mathbf{C} \setminus \{0\}$.

We show that the Bergman space of $\mathcal{W}_\infty$ is not trivial. In this work we study its Bergman kernel K and projection $\mathcal{P}_\infty$. We prove that $(z, w) \mapsto K(z, \overline{w})$ extends holomorphically near each point of the boundary except for the diagonal of $\partial\mathcal{W}_\infty \times \partial\mathcal{W}_\infty$ and for the critical set $(\mathcal{A} \times \mathcal{W}_\infty) \cup (\mathcal{W}_\infty \times \mathcal{A})$. We then find an expansion for K near the critical set which allows us to prove the following:

(1) For all $s > 0$, the Bergman projection $\mathcal{P}_\infty$ does not map the Sobolev space $W^s(\mathcal{W}_\infty)$ into itself.

(2) For $p \neq 2$, $\mathcal{P}_\infty$ does not map $L^p(\mathcal{W}_\infty)$ into itself.

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