Poster Proposal

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by

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Title

Controllability of the heat equation with a Hardy potential arising at the boundary

Abstract

We are devoted to analyze control properties for the heat equation with singular potential $-\mu/|x|^2$ arising at the boundary of a smooth domain $\Omega \subset \mathbb{R}^N$, $N \geq 1$. This problem was firstly studied by Vancostenoble and Zuazua [2] and then generalized by Ervedoza [1] in the context of interior singularity. Roughly speaking, these results showed that for any value of parameters $\mu \leq \mu(N) := (N-2)^2/4$, the corresponding parabolic system can be controlled to zero with the control distributed in any open subset of the domain. The critical value $\mu(N)$ stands for the best constant in the Hardy inequality with interior singularity.

When considering the case of boundary singularity a better critical Hardy constant is obtained, namely $\mu_N := N^2/4$.

Our main contribution extends the previous results in [2], [1], to the case of boundary singularity. More precisely, we show that for any $\mu \leq \mu_N$, we can lead the system to zero state using a distributed control in any open subset.

We emphasize that our results cannot be obtained straightforwardly from the previous works [2], [1].

References

[1] S. Ervedoza, *Control and stabilization properties for a singular heat equation with an inverse-square potential* Comm. Partial Differential Equations, **33** (2008), no. 10-12, 1996–2019.

[2] J. Vancostenoble and E. Zuazua, *Null controllability for the heat equation with singular inverse-square potentials* J. Funct. Anal., **254** (2008), no. 7, 1864–1902.

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