

Pointwise convergence of the Klein-Gordon flow

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Resumen. In this poster/talk, we will deal with a nonlinear pointwise convergence theory for the case of the 3d cubic Klein-Gordon equation. In particular, we address the following question, considering the initial datum in $H^s(\mathbb{T}^3) \times H^{s-1}(\mathbb{T}^3)$: which is the minimal regularity s such that the solution of the aforementioned equation converges, as time goes to 0 and almost everywhere in space, to the initial datum? Departing from the well-known result for the linear setting (that is, such pointwise convergence holds true if and only if $s > 1/2$), we answer to the question in two different ways that lead us to two different minimal regularities:

- In a deterministic sense, we prove that the nonlinear counterpart of the aforementioned result for the linear flow holds true if and only if $s > 1/2$.
- In a probabilistic sense, we lower the regularity assumption to $s > 0$ through a suitable randomization of the initial data

Palabras clave: Klein-Gordon equation; maximal estimates; smoothing estimates; random data..

Referencias

- [1] N. Burq and N. Tzvetkov. Random data Cauchy theory for supercritical wave equations. I. Local theory. *Invent. Math.*, 173(3):449–475, 2008.
- [2] E. Compaan, R. Lucà, G. Staffilani. Pointwise Convergence of the Schrödinger Flow. *Int. Math. Res. Not.*, 1, 596–647, 2021.
- [3] M. G. Cowling. Pointwise behavior of solutions to Schrödinger equations. In *Harmonic analysis (Cortona, 1982)*, volume 992 of *Lecture Notes in Math.*, pages 83–90. Springer, Berlin, 1983.
- [4] R. Lucà and P. Merino. Pointwise convergence of the Klein-Gordon flow. *arXiv preprint arXiv:2402.10105*, 2024.

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