The cubic fourth order Schrödinger equation on a star graph

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Abstract

In this talk, we present some recent results related to the wellposedness of the cubic fourth order Schrödinger equation on star graph structure $\mathcal{G}$, [9]:

$$i\partial_t u - \partial_x^4 u - \lambda|u|^2 u = 0,$$

Here, we consider $\mathcal{G}$ composed by $N$ edges parameterized by half-lines $(0, +\infty)$ attached with a common vertex $\nu$. With this structure the manuscript proposes to study the well-posedness of a dispersive model on star graphs with three appropriated vertex conditions by using the boundary forcing operator approach, more precisely, we give positive answer for the Cauchy problem in low regularity Sobolev spaces. We have noted that this approach seems very efficient, since this allows to use the tools of Harmonic Analysis, for instance, the Fourier restriction method of Bourgain, while for the other known standard methods to solve partial differential partial equations on star graphs are more complicated to capture the dispersive smoothing effect in low regularity. The arguments presented in this work has prospects to be applied for others nonlinear dispersive equations on the context of star graphs with unbounded edges.

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References


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