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Null coordinates for quasi-periodic 1d wave operators and applications

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Given a quasi-periodic wave operator $\psi_{tt} - \psi_{xx} + \mathcal{B}^{xx}(\omega t, x)\partial_{xx}$, where $\mathcal{B}^{xx} : \mathbb{T}^{\nu+1} \rightarrow \mathbb{R}$ is parity preserving, reversible and small enough and where ω is diophantine, we explain how to construct \emph{null coordinates} respecting the quasi-periodicity. In these coordinates, the principal symbol of the wave operator then has constant coefficients.

As an application, we give a novel proof of \emph{reducibility}, a typical element for the construction of quasi-periodic solutions to non-linear pdes, obtained very recently in a work of Berti, Feola, Procesi and Terracina on the quasi-periodically forced linear Klein-Gordon.

This is a joint work with Athanasios Chatzikaleas.

Presenter: SMULEVICI, Jacques