

Quasi-Periodic Solutions to the Nonlinear Klein-Gordon Equations in Two Dimensions

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Abstract

We construct time quasi-periodic solutions to the nonlinear Klein-Gordon equation with polynomial nonlinear terms on the two dimensional torus:

$$\frac{\partial^2 u}{\partial t^2} - \Delta u + u + u^{p+1} = 0.$$

To our knowledge, this is the first such result for the Klein-Gordon equation above dimension one. The analysis explores in an essential way the submodule structure on a dual Fourier lattice. We shall discuss the main ideas of the approach.