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Existence of global solutions for a class of vector fields on the three-dimensional torus.

(English) [Zbl 1403.35081](#)

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Summary: This work deals with global solvability of a class of vector fields of the form $L = \partial/\partial t + (a(x) + ib(x))(\partial/\partial x + \lambda\partial/\partial y)$, where $a, b \in C^\infty(\mathbb{T}^1, \mathbb{R})$ and $\lambda \in \mathbb{R}$, defined on the three-dimensional torus $\mathbb{T}^3_{(x,y,t)} \simeq \mathbb{R}^3/2\pi\mathbb{Z}^3$. In addition to the interplay between the order of vanishing of the functions a and b , the change of sign of b between two consecutive zeros of $a + ib$ has influence in the global solvability. Also, a Diophantine condition appears in a natural way in our results.

MSC:

35F05 Linear first-order PDEs

35A01 Existence problems for PDEs: global existence, local existence, non-existence

35B10 Periodic solutions to PDEs

Cited in 1 Document

Keywords:

condition (\mathcal{P}); Fourier series; Diophantine condition

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