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论文

七阶非线性色散方程初值问题解的局部和整体存在性

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摘要：

该文研究七阶非线性弱色散方程: $\partial u/\partial t + au(\partial u/\partial x) + \beta(\partial^3 u/\partial x^3) + \gamma(\partial^5 u/\partial x^5) + \mu(\partial^7 u/\partial x^7)=0$, $(x,t)\in R^2$ 的初值问题, 通过运用震荡积分衰减估计的最近结果, 首先对相应线性方程的基本解建立了几类 Strichartz 型估计. 其次, 应用这些估计证明了七阶非线性弱色散方程初值问题解的局部与整体存在性和唯一性. 结果表明, 当初值 $u_0(x)\in H^s(R)$, $s\geq 2/13$ 时, 存在局部解; 当 $s\geq 1$ 时, 存在整体解.

关键词： 色散方程；初值问题；解；局部存在性；整体存在性.

分类号：

35Q30; 35G25; 42B25

The Initial Value Problem of the Seventh Order Weakly Dispersi ve Equations

DAO Shuang-Beng, CUI Chang-Bin

Abstract:

This paper is devoted to studying the initial value problem of a class of seventh order weakly nonlinear dispersive equations: $\partial u/\partial t + au(\partial u/\partial x) + \beta(\partial^3 u/\partial x^3) + \gamma(\partial^5 u/\partial x^5) + \mu(\partial^7 u/\partial x^7)=0$, $(x,t)\in R^2$. By using recently established decay estimates for oscillatory integrals, the authors firs t establish several Strichartz type estimates for the fundamental solution of the corresponding linear problem. Then the authors prove that a local solution exists if t he initial function $u_0(x)\in H^s(R)$, $s\geq 2/13$, and a global solution exists if $s\geq 1$.

Keywords: Dispersive equation Initial value problem; Solution; Local existence Global existence

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