

<<非线性偏微分方程分析讲义（第3卷）>>

图书基本信息

书名：<<非线性偏微分方程分析讲义（第3卷）>>

13位ISBN编号：9787040363395

10位ISBN编号：7040363399

出版时间：2013-1

出版时间：高等教育出版社

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内容概要

《非线性偏微分方程分析讲义(第3卷)(英文)》由林芳华、张平主编。中国科学院数学与系统科学研究院于2011年4月至2011年10月举办题为“非线性偏微分方程中的分析”的主题研讨班。

《非线性偏微分方程分析讲义(第3卷)(英文)》收集了其中8篇讲义,包括Nicolas Burq教授等关于水波问题Cauchy理论的低正则性, Jean-Yves Chemin教授关于Navier-Stokes方程,以及Isabelle Galiagher教授关于海洋流的半经典分析的精彩内容等。

这些内容在一定程度上反应了近年来在流体力学的恒关数学理论方面的一些进展。

书籍目录

T.Alazard,N.Burq,and C.Zuily:Low Regularity Cauchy Theory for the Water-waves Problem:Canals and Wave Pools
Jean-Yves Chemin:Navier-Stokes System
Isabelle Gallagher:Semi-classical Analysis of Oceanic Flows
Patrick G é rard:An Introduction to the Cubic Szeg(o) Equation
David G é rard-Varet:Some Recent Mathematical Results on Fluid-Solid Interaction
Hideo Kozono and Taku Yanagisawa:Lr-Helmholtz Decomposition and Its Application to the Navier-Stokes Equations
F.Rousset and N.Tzvetkov:Lectures on Transverse Instability of Solitary Water-waves
J.-C.Saut:Lectures on the Mathematical Theory of Viscoelastic Fluids

章节摘录

版权页：插图：3.2 Domains with boundaries: the boundary layer When the Navier-Stokes solutions u_ε and the Euler solution u are defined in a domain Ω with boundaries, the convergence issue gets considerably harder. The difficulty lies in the boundary conditions that are added at $\partial\Omega$. For $\varepsilon = 0$ (Euler equation), only the tangency condition $u \cdot n|_{\partial\Omega} = 0$ (3.2) is satisfied. But for $\varepsilon \neq 0$, that is when the viscosity is turned on, the fluid must stick at the boundary, which translates into the Dirichlet condition $u_\varepsilon|_{\partial\Omega} = 0$. (3.3) In order to satisfy this no-slip condition, the tangential momentum at the boundary is somehow diffused into the domain. As the viscosity is very small, this change of momentum is concentrated near the boundary, in a thin zone called a boundary layer. Mathematically, this boundary layer corresponds to a singular dependence of u_ε with respect to ε . Hence, the whole point is to understand this boundary layer and its impact on the asymptotics $\varepsilon \rightarrow 0$. One can even be more specific: the whole point is to determine whether or not the velocity field u_ε concentrates in an ε -neighborhood of the boundary.

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编辑推荐

《非线性偏微分方程分析讲义(第3卷)(英文)》可作为从事非线性偏微分方程、特别是流体力学方程和微局部分析研究的科研人员和学习参考用书。

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