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<<逼近与重整化群对称>>

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前言

This is an introduction to a new field in applied group analysis. Namely, the book deals with the so-called renormalization group （briefly renormgroup） symmetries considered in the framework of approximate transformation groups. The notion of the renormalization group and the renormalization group method were introduced in theoretical physics by N. N. Bogoliubov and D. V. Shirkov in 1950s. Renormgroup symmetries provide a basis for the renormgroup algorithm for improving solutions to boundary value problems by converting "less applicable solutions" into "more applicable solutions". The algorithm is particularly useful for improving approximate solutions given by the perturbation theory.We present in a concise form the essence of the mathematical apparatus for computing approximate and renormgroup symmetries using the infinitesimal techniques of the modern group analysis. In order to make the book self-contained, we provide in Chapter 1 an outline of basic notions from the classical Lie group analysis of differential equations. Chapters 2 and 3 reflect new trends in the modern group analysis. Chapter 2 contains a brief discussion of approximate transformation groups.In Chapter 3 we discuss methods for calculating symmetries of integro-differential equations. Renormgroup symmetries are introduced and illustrated by several examples in Chapter 4. The renormgroup algorithm is applied to various nonlinear problems in mathematical physics in Chapter 5.The authors wish to express their gratitude to Professor Dmitry V. Shirkov, a world leader in the study of renormalization groups in quantum field theory. Our collaboration with him over many years plays a decisive role in preparing the "physical part" （Chapters 3, 4 and 5 ） of the monograph. We also would like to say a word of genuine appreciation in memory of late Dr. Veniamin V. Pustovalov who made our collaboration possible and who inspired many ideas that form a ground of this book.

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内容概要

Approximate and Renormgroup Symmetries deals with approximate transformation groups, symmetries of integro-differential equations and renormgroup symmetries. It includes a concise and self-contained introduction to basic concepts and methods of Lie group analysis, and provides an easy-to-follow introduction to the theory of approximate transformation groups and symmetries of integrodifferential equations. The book is designed for specialists in nonlinear physics--mathematicians and non-mathematicians--interested in methods of applied group analysis for investigating nonlinear problems in physical science and engineering.

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作者简介

作者：(瑞典)伊布拉基莫夫 (Nail H.ibragimov) (俄罗斯)科瓦勒夫 (Vladimir F.Kovalev) Dr. Nail H. Ibragimov is a professor at the Department of Mathematics and Science, Research Centre ALGA, Sweden. He is widely regarded as one of the world's foremost experts in the field of symmetry analysis of differential equations;Vladimir F. Kovalev is a leading scientist at the Institute for Mathematical Modeling, Russian Academy of Science, Moscow.

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