<<传染病的建模与动力学>>

图书基本信息

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前言

This book contains a carefully chosen and coordinated series of lec ture notes at the China-Canada Joint Program on Infectious Disease Modeling, held in Xi ' an Jiaotong University, May 10-29, 2006 The jpint program consists of a summer sch001 attended by over 100 students frOIU a variety of backgrounds, and a workshop participated by invited speakers frpin both academic institutes and public health agencies such a8 US Centers for Disease Control and Prevention（CDC）and Public Health Agency of Canada（PHAC） These COntributions are grouped into three categories：lectures notes that briefly introduce the basic concepts and techniques；survey articles that provide reviews on some specific diseases or issues；and research papers dedicating to sonic important problems of current interest in the epidemiological modeling There are also two articles describing some recent progresses by a Chinese and a Canadian team The aim of this book iS to provide fundamental methods and techniques for students who are interested in epidemiological modeling. and to guide iunior research scientists to some frontiers in the interfaee of mathematical modeling and public health Contributions are provided from difierent and complementary angles, with the balance between the theory and applications, between mathematical modeling and its applications to public health policy. It iS hoped that this book can help in increasing the awareness of the importance of mathematical modeling in the study of infectious disease transmission, and in bridging the gap between nlathematical modelers in basic theoretical research and medical scientists and public health policy makers working in health research institutes There has been a long history of matheinatical epidemiology and there are many Successful stories in applying mathematical modeling to optimal design of feasible public health policy for disease prevention, control and management Some emerging and re-emerging infectious dis eases such as HIV FMD. SARS and pandemic influenza have generated substantial renewed interest and have been continuing to challenge inodelers for effective mathematical and computational models Covering a comprehensive range of topics, this book hopefully provides an alternative and additional textbook for graduate students in applied 111athemat- ics, health informatics, applied statistics and qualitative public health.

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内容概要

This book provides a systematic introduction to the fundamental methods and techniques and the frontiers of- along with many new ideas and results on -- infectious disease modeling, parameter estimation and transmission dynamics. It provides complementary approaches, from deterministic to statistical to network modeling; and it seeks viewpoints of the same issues from different angles, from mathematical modeling to statistical analysis to computer simulations and finally to concrete applications.

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书籍目录

章节摘录

The goal of this synthetic paper is to introduce a part of research directions on epidemic dynamics investigated by our group and our main results during the past several years Before this. some basic knowledge on epidemic dynamics will be introduced which may be helpful to those readers who are not familiar with the mathematical modeling oil Epidemiology 1 Basic knowledge on epidemic dynamics Epidemic dynamics is an important method of studying tile spread of infectious disease qualitatively and quantitatively It is based on the specific property of population growth, the spread rules of infectious disemses, and the related social factors , etc, to construct nlathelnatical nmdels reflecting the dynamic properties of infectious diseases. to analvze the dynamical behavior and to do some simulations The research results are helpful to predict the developing tendency of the infectious disease to determine the key factors of the spread of infectious disease and to seek the optimum strategies of preventing and controlling the spread of infectious diseases In contrast with classic biometrics. dyuamical methods can show the transmission rules of|nfectious diseases from the mechanisin of transmission of the disease, 80 that people may know some global dynanlic behavior of the translnission process Combining statistics methods and computer simulations with dynamic methods could make modeling and the original analysis more realistic and ulore reliable make the comprehension for spread rule of infectious diseases more thorough.

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