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**Sinopsis**

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Many chemical and biological processes take place in fluid environments in constant motion _ chemical reactions in the atmosphere, biological population dynamics in the ocean, chemical reactors, combustion, and microfluidic devices. Applications of concepts from the field of nonlinear dynamical systems have led to significant progress over the last decade in the theoretical understanding of complex phenomena observed in such systems.

This book introduces the theoretical approaches for describing mixing and transport in fluid flows. It reviews the basic concepts of dynamical phenomena arising from the nonlinear interactions in chemical and biological systems. The coverage includes a comprehensive overview of recent results on the effect of mixing on spatial structure and the dynamics of chemically and biologically active components in fluid flows, in particular oceanic plankton dynamics.

Contents:
Fluid Flows
Mixing and Dispersion in Fluid Flows
Chemical and Ecological Models
Reaction-Diffusion Dynamics
Fast Binary Reactions and the Lamellar Approach
Decay-Type and Stable Reaction Dynamics in Flows
Mixing in Autocatalytic-Type Processes
Mixing in Oscillatory Media
Further Reading