Chaplain / Preziosi

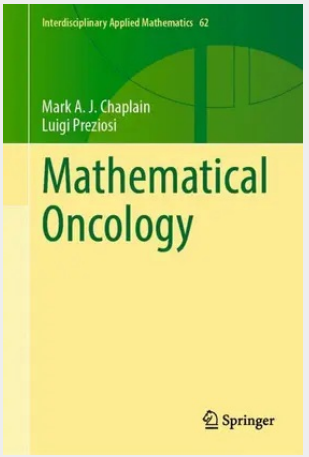
Mathematical Oncology

Cancer is a complex and devastating disease, responsible for millions of deaths worldwide each year. While traditional oncology focuses on diagnosis and treatment through medical, surgical, radiation and clinical techniques, mathematical oncology has emerged as a powerful discipline that applies mathematical modelling to understand cancer growth, spread, and response to treatment.

This volume provides a comprehensive exploration of mathematical approaches in oncology, offering a deep dive into differential equation models and biomechanical models. From reaction-diffusion equations that capture tumour growth and spread, to mechanical models that examine cellular interactions within tissues and vessels, this book presents both analytical techniques and computational modelling approaches that enhance our understanding of cancer dynamics.

This book serves as both a reference for researchers and a foundation for integrating mathematical oncology into university curricula. By bridging the gap between mathematics, biology, and clinical research, it highlights the crucial role of mathematical modelling in advancing cancer treatment strategies and improving patient outcomes.

This book is an overview of recent mathematical models developed to examine stages of cancer growth and development, from single mutant cell to metastatic spread of the disease.



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