

Therapeutic Applications of Monte Carlo Calculations in Nuclear Medicine

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This book examines the applications of Monte Carlo (MC) calculations in therapeutic nuclear medicine, from basic principles to computer implementations of software packages and their applications in radiation dosimetry and treatment planning. It is written for nuclear medicine physicists and physicians as well as radiation oncologists, and can serve as a supplementary text for medical imaging, radiation dosimetry and nuclear engineering graduate courses in science, medical and engineering faculties. With chapters written by recognised authorities in that particular field, the book covers the entire range of MC applications in therapeutic medical and health physics, from its use in imaging prior to therapy to dose distribution modelling targeted radiotherapy. The contributions discuss the fundamental concepts of radiation dosimetry, radiobiological aspects of targeted radionuclide therapy and the various components and steps required for implementing a dose calculation and treatment planning methodology in radioimmunotherapy. Some computer programmes (for example MIRDOSE, MABDOS, 3D-ID) are described and illustrated with some useful features and clinical applications. Other potential applications of MC techniques are also discussed together with computing aspects of radiation transport calculations



Key Features

- Contributions from leading experts in their field
- Several introductory chapters to introduce the Monte Carlo method and nuclear medical imaging techniques as well as radiation biology concepts to allow a better understanding.
- Many chapters in the book summarise scientific developments in the last couple of decades and others deal with completely new techniques fully developed in recent years.

Readership

Medical and health physicists, computational physicists

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