Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation)

Bernard Shizgal

Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation)

Bernard Shizgal

Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) Bernard Shizgal

This book is a pedagogical presentation of the application of spectral and pseudospectral methods to kinetic theory and quantum mechanics. There are additional applications to astrophysics, engineering, biology and many other fields. The main objective of this book is to provide the basic concepts to enable the use of spectral and pseudospectral methods to solve problems in diverse fields of interest and to a wide audience. While spectral methods are generally based on Fourier Series or Chebychev polynomials, non-classical polynomials and associated quadratures are used for many of the applications presented in the book. Fourier series methods are summarized with a discussion of the resolution of the Gibbs phenomenon. Classical and non-classical quadratures are used for the evaluation of integrals in reaction dynamics including nuclear fusion, radial integrals in density functional theory, in elastic scattering theory and other applications. The subject matter includes the calculation of transport coefficients in gases and other gas dynamical problems based on spectral and pseudospectral solutions of the Boltzmann equation. Radiative transfer in astrophysics and atmospheric science, and applications to space physics are discussed. The relaxation of initial non-equilibrium distributions to equilibrium for several different systems is studied with the Boltzmann and Fokker-Planck equations.
The eigenvalue spectra of the linear operators in the Boltzmann, Fokker-Planck and Schrödinger equations are studied with spectral and pseudospectral methods based on non-classical orthogonal polynomials.
The numerical methods referred to as the Discrete Ordinate Method, Differential Quadrature, the Quadrature Discretization Method, the Discrete Variable Representation, the Lagrange Mesh Method, and others are discussed and compared.
MATLAB codes are provided for most of the numerical results reported in the book - see Link under 'Additional Information' on the the right-hand column.

Download and Read Free Online Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) Bernard Shizgal

---

From reader reviews:

Erin Chretien:

Here thing why this kind of Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) are different and dependable to be yours. First of all studying a book is good however it depends in the content from it which is the content is as tasty as food or not. Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) giving you information deeper as different ways, you can find any book out there but there is no reserve that similar with Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation). It gives you thrill looking at journey, its open up your own eyes about the thing which happened in the world which is might be can be happened around you. You can easily bring everywhere like in area, café, or even in your way home by train. Should you be having difficulties in bringing the published book maybe the form of Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) in e-book can be your alternative.

Brian Kelley:

The experience that you get from Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) will be the more deep you searching the information that hide within the words the more you get considering reading it. It does not mean that this book is hard to understand but Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) giving you thrill feeling of reading. The article writer conveys their point in particular way that can be understood by anyone who read it because the author of this reserve is well-known enough. This particular book also makes your current vocabulary increase well. That makes it easy to understand then can go together with you, both in printed or e-book style are available. We advise you for having that Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) instantly.

Gavin Wilkins:

Often the book Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) will bring one to the new experience of reading the book. The author style to describe the idea is very unique. When you try to find new book to learn, this book very appropriate to you. The book Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) is much recommended to you to see. You can also get the e-book from the official web site, so you can quicker to read the book.

Sanjuana Day:

Within this era which is the greater man or woman or who has ability in doing something more are more

valuable than other. Do you want to become certainly one of it? It is just simple way to have that. What you have to do is just spending your time not very much but quite enough to possess a look at some books. One of several books in the top list in your reading list is Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation). This book that is qualified as The Hungry Hillsides can get you closer in getting precious person. By looking upwards and review this publication you can get many advantages.

Read Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) by Bernard Shizgal for online ebook

Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) by Bernard Shizgal Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) by Bernard Shizgal books to read online.

Online Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) by Bernard Shizgal ebook PDF download

Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) by Bernard Shizgal Doc

Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) by Bernard Shizgal Mobipocket

Spectral Methods in Chemistry and Physics: Applications to Kinetic Theory and Quantum Mechanics (Scientific Computation) by Bernard Shizgal EPub