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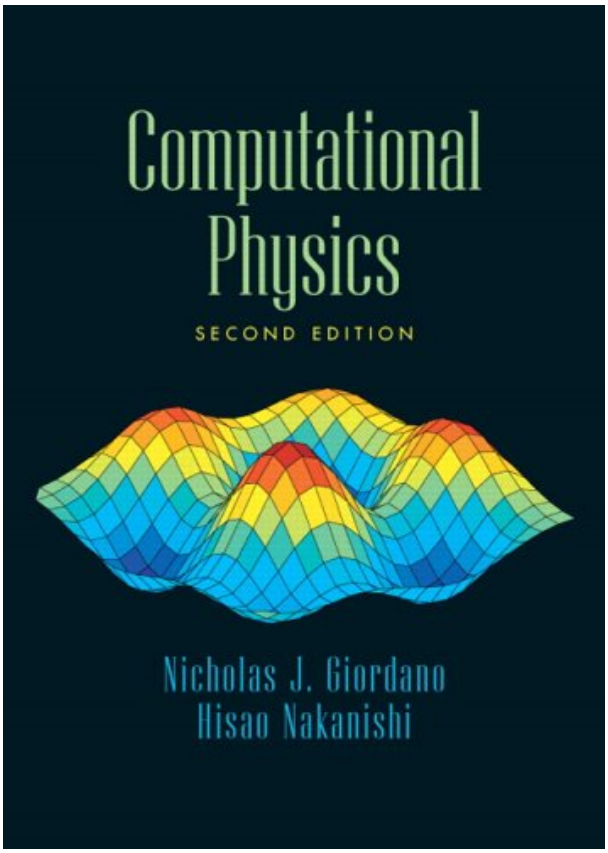

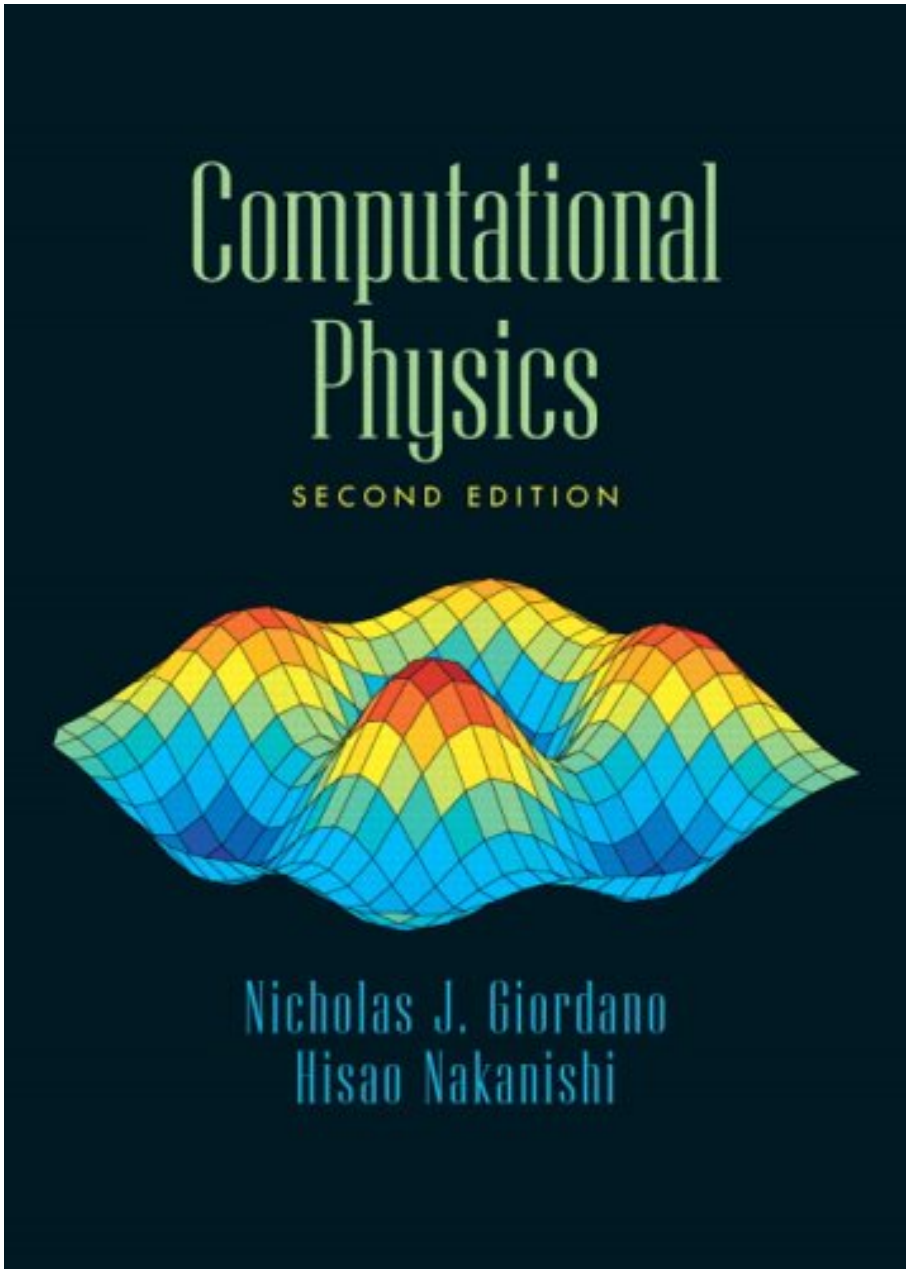

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Conveying the excitement and allure of physics, this progressive text uses a computational approach to introduce students to the basic numerical techniques used in dealing with topics and problems of prime interest to today's physicists.

About the Author

Nicholas Giordano obtained his B.S. at Purdue University and his Ph.D. at Yale University. He has been on the faculty at Purdue since 1979, served as an Assistant Dean of Science from 2000-2003, and is currently the Hubert James Distinguished Professor of Physics. His research interests include electrical conduction, superconductivity, and magnetism in ultra-small metallic structures, along with musical acoustics and the physics of the piano. Ideas for this book grew out of the course on computational physics that he developed and taught in the early 1990s. Professor Giordano earned a Computational Science Education Award from the Department of Energy in 1997, and in 2004 was named Indiana Professor of the Year by the Carnegie Foundation for the Advancement of Teaching and the Council for the Advancement and Support of Education.

Hisao Nakanishi earned his B.S. from Brown University and his Ph.D. from Harvard University. His Ph.D. research concerned scaling and universality in a geometric phase transition called percolation and he has been interested in scale-invariance ever since. During his first postdoctoral work at Cornell he was introduced to the problem of surface critical phenomena such as wetting phase transitions, and later at the University of California, Santa Barbara, he started working on the statistics of diffusion and polymers in earnest. .In 1992 Professor Nakanishi was a part of the team that won a Gordon Bell Prize for the application of parallel computing to a problem in polymer statistics. More recently he has also put on another hat as a developer of a computer-based interactive exercise system which is used by a few thousand students at Purdue each year.

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Offers examples on statistical physics and quantum mechanics. Contains ample explanations of the necessary algorithms
students need to help them write original programs, and provides many example programs and calculations for reference.

- Sales Rank: #120404 in Books
- Brand: Giordano, Nicholas J./ Nakanishi, Hisao/ Kosaka, Jiro
- Published on: 2005-07-31
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4 of 4 people found the following review helpful.
A great way to learn the material.
By Mark T.
Let me begin by saying that I have read through many books on computational physics and this is by far the one that I prefer. It seems suitable for use in a classroom or for self study. The writing style is clear, almost conversational and new concepts are developed carefully and can be easily understood.

The unfortunate part of the book is of course the use of Basic for the examples. I agree with the author that this language, and especially the version used, is suitable and even easy to use for the subject at hand, however it is not an industry standard language.

I would much rather see C, C++ or even Python used for the examples. It is not hard to translate from the Basic versions, but many readers of this book will be scientists, but not generally computer scientists. And they may be learning to program as they are using this book. If the examples were written using basic C syntax, the reader would be well on his way to learning not only computational physics, but a widely used language as well.

With this light criticism, I really like the book and have not found anything that I would prefer regardless of the programming language used.

0 of 0 people found the following review helpful.
Four Stars
By Amazon Customer
It is a great introduction, but some explanations to the topic are unclear or murky

18 of 18 people found the following review helpful.
great book for learning a model by simulations
By Jerry G
I'm glad I bought this book. I was hesitant at first, while perusing it in the bookstore, because it seemed to be aimed at an audience that is, well, too undergraduate. However the book gets directly to the essence of the algorithms used to carry out simulations: nothing extraneous. Within an hour after sitting down to read a chapter, one can often have the first working code finished. It is through trying simulations, playing with parameters, and seeing what happens that one starts to get a feel for the models which are otherwise just differential equations on paper. The style of exposition is informal and lively. The range of subjects covered is diverse. It presumes the reader is familiar with physics of the models discussed, yet each chapter begins with a short review. The book is organized in a way that permits skipping around, which I like, and I found that the exercises are packed with suggestions and new things to try. All in all it is a very good book for someone who may know next to nothing about a particular physics model and wants to learn it though computer simulation.

Since the publisher doesn't include the "search inside" feature, here is a list of chapter headings:
First numerical problems. Realistic Projectile Motion. Oscillatory Motion and Chaos. The Solar System. Potentials and Fields. Waves. Random Systems. Statistical Mechanics, Phase Transitions, and the Ising Model. Molecular Dynamics. Quantum Mechanics. Vibrations, Waves, and the Physics of Musical Instruments. Interdisciplinary Topics: Protein Folding, Earthquakes, Neural Networks and the Brain, Real Neurons and Actions Potentials, Cellular Automata.

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