This book is an introduction to the computational methods used in physics, but also in other scientific fields. It is addressed to an audience that has already been exposed to the introductory level of college physics, usually taught during the first two years of an undergraduate program in science and engineering. It assumes no prior knowledge of numerical analysis, programming or computers and teaches whatever is necessary for the solution of the problems addressed in the text.

The book starts with very simple problems in particle motion and ends with an in-depth discussion of advanced techniques used in Monte Carlo simulations in statistical mechanics. The level of instruction rises slowly, while discussing problems like the diffusion equation, electrostatics on the plane, quantum mechanics and random walks. All the material can be taught in two semesters, but a selection of topics can form the material of a one semester course. The book aims to provide the students with the background and the experience needed in order to advance to high performance computing projects in science and engineering. It puts emphasis on hands–on programming of numerical code but also on the production, analysis and interpretation of data. But it also tries to keep the students motivated by considering interesting applications in physics, like chaos, quantum mechanics, special relativity and the physics of phase transitions.

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