Preface

Classical Mechanics is a first step for those who begin to study Theoretical Physics. One can say that in this case, as in many other situations of life, the first step can be the most important one. In fact, the same subjects which are dealt with first in Mechanics are sometimes approached afterwards in more advanced courses such as Electrodynamics, Quantum Mechanics and Statistical Mechanics. Of course, the same concepts appear to be more sophisticated and sometimes more interesting when formulated in these frameworks. At the same time these formulations may also be more difficult. For this reason, the student who knows well Classical Mechanics can study other parts of Theoretical Physics easier and perhaps better.

The course of Classical Mechanics for Physics students is traditionally divided in two parts. The first one is technically simpler than the second one, which is also called Analytical Mechanics. In the second part, the mathematical and theoretical tools are more complicated and this allows us to consider the notions of Mechanics in a more general and profound way. At the same time, for many students, it is important to start the study of Analytical Mechanics with an appropriate preparation, and for this reason the one-semester introductory physics course is usually not enough. To address this situation, there is usually a course of Classical Mechanics, which is somehow intermediate between introductory Physics and Analytical Mechanics. Such an intermediate course is the subject of the present book. An important difference between such an introductory course and Analytical Mechanics is that the first one assumes a restricted use of mathematical methods and, therefore, leaves more room for physics intuition.

Classical Mechanics is known for centuries, but here we have introduced some relatively modern concepts, e.g., Einstein's equivalence principle. It turns out that they are useful also at the introductory level and, actually, help to solve some problems in a more simple way.

We believe that the textbooks directed to students should have the following important feature: they have to take into account the realities of academic life, when students have many disciplines to study in a short period of time. So the textbooks should be sufficiently short. In this book, we tried to be brief. The book is technical and aimed at clarifying the key notions and show how to solve problems of a

standard level of difficulty, and sometimes a bit more difficult ones. Finally, we hope this book will be useful for the readers and wish everyone a good study of Classical Mechanics.

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