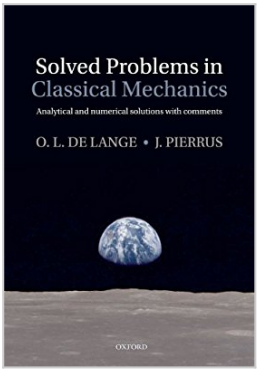

Solved Problems in Classical Mechanics: Analytical and Numerical Solutions with Comments

By O.L. de Lange, J. Pierrus

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Apart from an introductory chapter giving a brief summary of Newtonian and Lagrangian mechanics, this book consists entirely of questions and solutions on topics in classical mechanics that will be encountered in undergraduate and graduate courses. These include one-, two-, and three- dimensional motion; linear and nonlinear oscillations; energy, potentials, momentum, and angular momentum; spherically symmetric potentials; multi-particle systems; rigid bodies;
translation and rotation of the reference frame; the relativity principle and some of its consequences. The solutions are followed by a set of comments intended to stimulate inductive reasoning and provide additional information of interest. Both analytical and numerical (computer) techniques are used to
obtain and analyze solutions. The computer calculations use Mathematica (version 7), and the relevant code is given in the text. It includes use of the interactive Manipulate function which enables one to observe simulated motion on a computer screen, and to study the effects of changing parameters.

The book will be useful to students and lecturers in undergraduate and graduate courses on classical mechanics, and students and lecturers in courses in computational physics.

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Review

"The authors make significant contributions to classical mechanics by considering more complex and hence more realistic problems, many of which are only tractable on the computer ... The book is enormously pedagogical and useful. It is a very good resource for teaching standard theoretical and computational classical mechanics. The range of topics within the book is impressive." -- *South African Journal of Science*

"de Lange and Pierrus have produced a well-balanced text which fits its purpose well and stands to appeal to a broad range of readers." -- *Contemporary Physics*

About the Author

Owen de Lange is a Professor of Physics at the University of KwaZulu-Natal. His research interests include: electromagnetic theory, molecular physics, dislocation interactions, superconductivity and educational physics. He is co-author of two monographs: Operator methods in quantum mechanics, and Multipole theory in electromagnetism. The former book was awarded the University of Natal book prize (1994) and the Bill Venter/Altron award (1995) for research published in book form.

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