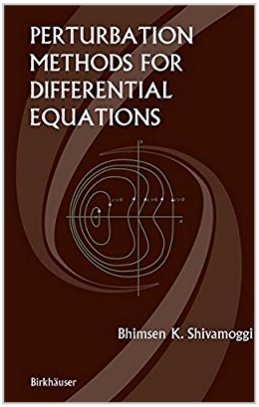

Perturbation Methods for Differential Equations

By Bhimsen Shivamoggi

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Perturbation methods are widely used in the study of physically significant differential equations, which arise in Applied Mathematics, Physics and Engineering.; Background material is provided in each chapter along with illustrative examples, problems, and solutions.; A comprehensive bibliography and index complete the work.; Covers an important field of solutions for engineering and the physical sciences.; To allow an interdisciplinary readership, the book focuses almost exclusively on the procedures and the underlying ideas and soft pedal the proofs; Dr. Bhimsen K. Shivamoggi has authored seven successful books for various publishers like John Wiley & Sons and Kluwer Academic Publishers.

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Perturbation Methods for Differential Equations By Bhimsen Shivamoggi Bibliography

- Sales Rank: #4311492 in Books
- Brand: Brand: Birkhäuser
- Published on: 2002-12-13
- Original language: English
- Number of items: 1
- Dimensions: 9.21" h x .94" w x 6.14" l, 1.50 pounds
- Binding: Hardcover
- 354 pages

Editorial Review

Review

From the reviews:

"The book is concerned...with singular perturbation phenomena for ordinary and partial differential equations. Instead of presenting general theory, the author shows how various perturbation techniques work in concrete examples. . . . Applications are quite numerous and include fluid dynamics, solid mechanics, and plasma physics. . . . A great variety of examples coming from real applications makes the book a very nice source for courses on perturbation methods. A number of exercises together with appendices covering some mathematical topics used in the text help a lot in making it practically self-contained." **?Mathematical Reviews**

This book is focused on perturbation methods mainly applied to solve both ordinary and partial differential equations … One of the unusual features of the treatment is motivated by the author's notes devoted to a mix of students in applied mathematics, physics, and engineering. Therefore, it is intended to serve as a textbook for undergraduate students of the previously mentioned branches of science. The book can serve also as an example of how an asymptotic analysis may easily move between various disciplines … Since the book covers a great deal of material, it is recommended to students and researchers already familiar with solid and fluid mechanics, as well as with plasma physics." **?Applied Mechanics Review**

"This monograph presents an overall introduction to singular perturbation methods…. [It] aims to describe the procedures and the intuitive ideas underlying the above methods. The author deliberately side-stepped the theoretical aspects and the mathematical proofs. Also, the theory is principally explained from examples. The result is a variety of problems, some of them with a physical background which is briefly described…. The exposition of ideas and computations are quite clear. The mathematics used by the author does not go far beyond an advanced calculus course…. It is valuable to have a book that can be used as a graduate text for students in applied mathematics, physics and engineering. The present book achieves this goal. It…will be useful to engineers and applied mathematicians who wish to obtain some, possibly formal, answer[s] to their problems. It can also be used by the mathematician as an overview o[f] the field…. As a conclusion, this work can be recommended as a good textbook for a graduate course in applied mathematics." **?Zentralblatt Math**

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"The present textbook shows how to find approximate solutions to nonlinear differential equations (both ordinary and partial) by means of asymptotic expansions. It discusses different singular perturbation methods (strained parameters, averaging, matched asymptotic expansions, multiple-scale, and quantum-field-theoretic renormalization) in an informal manner using specific examples from applications. It is easy to read and suitable for advanced undergraduate students requiring only some basic knowledge of [ODEs]."
?Monatshefte für Mathematik

Users Review

From reader reviews:

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