

Perturbations: theory and methods

Murdock, James A., author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20442831&lokasi=lokal>

Abstrak

Perturbations: Theory and Methods gives a thorough introduction to both regular and singular perturbation methods for algebraic and differential equations. Unlike most introductory books on the subject, this one distinguishes between formal and rigorous asymptotic validity, which are commonly confused in books that treat perturbation theory as a bag of heuristic tricks with no foundation. The meaning of "uniformity" is carefully explained in a variety of contexts. All standard methods, such as rescaling, multiple scales, averaging, matching, and the WKB method are covered, and the asymptotic validity (in the rigorous sense) of each method is carefully proved.

First published in 1991, this book is still useful today because it is an introduction. It combines perturbation results with those known through other methods. Sometimes a geometrical result (such as the existence of a periodic solution) is rigorously deduced from a perturbation result, and at other times a knowledge of the geometry of the solutions is used to aid in the selection of an effective perturbation method.

Dr. Murdock's approach differs from other introductory texts because he attempts to present perturbation theory as a natural part of a larger whole, the mathematical theory of differential equations. He explores the meaning of the results and their connections to other ways of studying the same problems.