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                       Order Reduction Methods with Applications / / by Elena Shchepakina,
                       Vladimir Sobolev, Michael P. Mortell

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   Disciplina   515.42

   Soggetti   Differential equations
                       Dynamics
                       Ergodic theory
                       Mathematical physics
                       Biomathematics
                       Applied mathematics
                       Engineering mathematics
                       Thermodynamics
                       Heat engineering
                       Heat transfer
                       Mass transfer
                       Ordinary Differential Equations
                       Dynamical Systems and Ergodic Theory
                       Mathematical Applications in the Physical Sciences
                       Mathematical and Computational Biology
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                       Engineering Thermodynamics, Heat and Mass Transfer

   Lingua di pubblicazione   Inglese

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   Nota di contenuto   Introduction -- Slow Integral Manifolds -- The Book of Numbers --
                       Representations of Slow Integral Manifolds -- Singular Singularly
                       Perturbed Systems -- Reduction Methods for Chemical Systems --

Specific Cases -- Canards and Black Swans -- Appendix: Proofs.

| Sommario/riassunto | These lecture notes provide a fresh approach to investigating singularly perturbed systems using asymptotic and geometrical techniques. It gives many examples and step-by-step techniques, which will help beginners move to a more advanced level. Singularly perturbed systems appear naturally in the modelling of many processes that are characterized by slow and fast motions simultaneously, for example, in fluid dynamics and nonlinear mechanics. This book's approach consists in separating out the slow motions of the system under investigation. The result is a reduced differential system of lesser order. However, it inherits the essential elements of the qualitative behaviour of the original system. Singular Perturbations differs from other literature on the subject due to its methods and wide range of applications. It is a valuable reference for specialists in the areas of applied mathematics, engineering, physics, biology, as well as advanced undergraduates for the earlier parts of the book, and graduate students for the later chapters. |