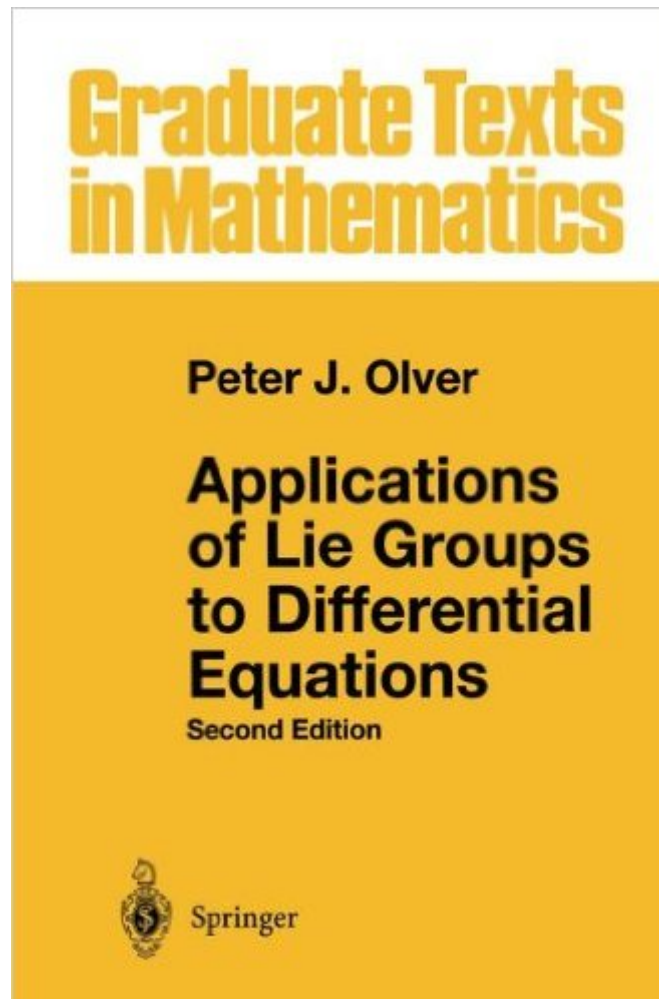


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Applications Of Lie Groups To Differential Equations (Graduate Texts In Mathematics)



Synopsis

A solid introduction to applications of Lie groups to differential equations which have proved to be useful in practice. The computational methods are presented such that graduates and researchers can readily learn to use them. Following an exposition of the applications, the book develops the underlying theory, with many of the topics presented in a novel way, emphasising explicit examples and computations. Further examples, as well as new theoretical developments, appear in the exercises at the end of each chapter.

Book Information

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Customer Reviews

Application of symmetries and Lie groups to differential equations (primarily PDE's) is a hot issue in contemporary Mathematics and Physics. Unfortunately, only few textbooks are available on this area. The book is one of the best attempts to put this topic into an ordered, easy to studying form, despite of its being a rapidly developing and thus hard to teaching issue. It survived two editions, and I am sure this is not the last. I am also sure that anyone who is involved in the area, will need to read this book, or have already read it.

First, let me preface this by saying my review is based on the FIRST EDITION of the book. Also, I have not read the entire thing, but much of it. I had no idea what a Lie Group was before picking this book up and found it to be an excellent introduction to a very fascinating subject. The autor gives a

fairly rigorous explication of the fundamentals of manifolds and groups in the first chapter, skipping proofs of harder facts. He then spends the rest of the book focusing on how to find symmetry groups of differential equations and their interpretation. He goes through detailed calculations and provides many helpful examples, without which I would have no chance of understanding the book. He gives very readable and easily applicable formulas for prolongation of group actions and vector fields, and supplies the heavy-handed theorems relating subvarieties of the prolonged group actions to symmetry groups of the DE's. Algebraists will find the book lacking in details and probably fairly myopic in scope. Applied people such as myself will find it indispensable as a resource for actual computation. The focus of the book is consistent with the original formulations by Lie and Noether and is still relevant and largely untaught in standard courses. Reading this book, I have learned some very helpful TECHNIQUES, and I suspect if that's what you're looking for this book will be a Godsend.

This is a thorough exposition of symmetry methods for ODE's, PDE's and Hamiltonian systems. It is a graduate level reference and not an introductory text.

Probably the definitive work on connecting Lie group theory to Noether's Theorem. Main complaint is that there are many instances of Olver skipping some important calculational details that require the reader to dig out some key steps in understanding how general principles may be applied.

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