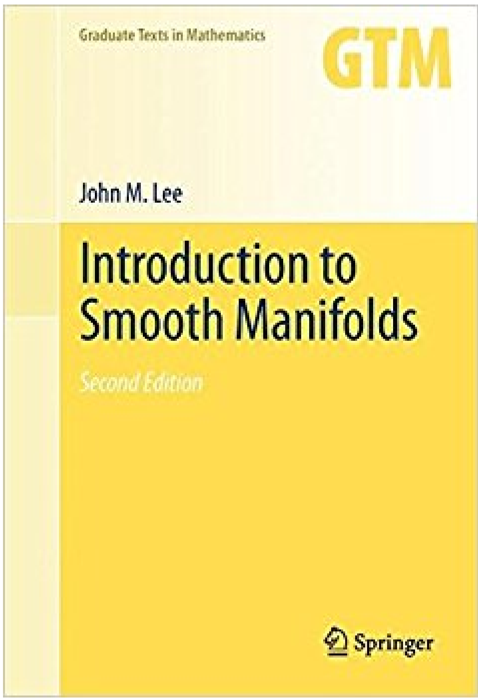
Introduction To Smooth Manifolds (Graduate Texts In Mathematics, Vol. 218)



Synopsis

This book is an introductory graduate-level textbook on the theory of smooth manifolds. Its goal is to familiarize students with the tools they will need in order to use manifolds in mathematical or scientific research--- smooth structures, tangent vectors and covectors, vector bundles, immersed and embedded submanifolds, tensors, differential forms, de Rham cohomology, vector fields, flows, foliations, Lie derivatives, Lie groups, Lie algebras, and more. The approach is as concrete as possible, with pictures and intuitive discussions of how one should think geometrically about the abstract concepts, while making full use of the powerful tools that modern mathematics has to offer.This second edition has been extensively revised and clarified, and the topics have been substantially rearranged. The book now introduces the two most important analytic tools, the rank theorem and the fundamental theorem on flows, much earlier so that they can be used throughout the book. A few new topics have been added, notably SardÃ¢â ¬â„¢s theorem and transversality, a proof that infinitesimal Lie group actions generate global group actions, a more thorough study of first-order partial differential equations, a brief treatment of degree theory for smooth maps between compact manifolds, and an introduction to contact structures.Prerequisites include a solid acquaintance with general topology, the fundamental group, and covering spaces, as well as basic undergraduate linear algebra and real analysis.

Book Information

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Customer Reviews

From the reviews of the second edition:Ã¢â ¬Å“It starts off with five chapters covering basics on smooth manifolds up to submersions, immersions, embeddings, and of course submanifolds. Ã¢â ¬Â| the book under review is laden with excellent exercises that significantly further the readerÃ¢â ¬â„¢s understanding of the material, and Lee takes great pains to motivate everything well all the way through Ã¢â ¬Â| . a fine graduate-level text for differential geometers as well as people like me, fellow travelers who always wish they knew more about such a beautiful subject.Ã¢â ¬Â• (Michael Berg, MAA Reviews, October, 2012)

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This book is exceptionally clear which was all I really wanted after gaining "insight" from Spivak. However it offered much more with good writing, motivation, examples, and problems. This has made the book my go to on the subject. As an added bonus, the notation Lee uses is the most intuitive that I've seen.

It works well a textbook in a course on differential topology, even if the instructor does not assign it as the class textbook. It is a very adaptable book with a lot of material. The one thing that you should know to do is skip chapters as needed.

"Gentlemen, for Gaussian rigor we have today no time" (Carl Gustav Jakob JACOBI).

This should be in the same category as Rudin's Principles of Mathematical Analysis and Munkres' Topology; every mathematician should read this.

This is not a review on the contents of the book. The contents are fantastic and Lee is a master expositer. My misgivings lie with the physical quality of the book and with all the Springer books that I have ordered through . The bindings are poor quality and have a tendency to break even after light use.

I love this smooth little manifold! Shipped quick and in PERFECT condition!

A very well written text in a world of poorly texts on this subject. So many authors seem to confound this elegant subject with a profusion of notation that is either poorly defined or garrulously described creating a mess for the student to unravel. Lee has done a superior job. He hasreasonably organized the material and gives proper definitions with a good amount of description. Although a few of the lemmas and theoremscould have a little better motivation and proof, the text is overall one of the best.

Much of what I have to say has already been said by reviewers of the first edition. But it's worth hearing again. This book is virtually flawless. The material is quite standard (manifold theory, vector bundles, Lie groups, distributions, etc.), but the level of organization and its close attention to detail sets this book apart. In particular, the proofs are quite thorough, with every step accounted for. All the background material that is needed (mainly topology and calculus) is listed in a fairly extensive appendix.I imagine someone with experience in differential geometry might find Lee's style tedious. However, as Lee himself points out in the introduction, students encountering differential geometry for the first time usually need this level of detail. I wholeheartedly agree with him. Differential geometry is a difficult subject to get into, with lots and lots of notation and a tendency to handwave technical details. I personally found Lee's book far superior to the relatively sparse class notes provided by my instructor. A careful reading of Lee's book is slow going, but there's no question that you will understand the material after you're done. (I wish the same could be said for all math books...)A nice feature is the very frequent exercises interspersed in the text. These delegate the easier or more repetitive proofs to the reader--and they're designed to be easy. This gives the reader a chance to get comfortable with the mechanics of the subject before being expected to tackle the more difficult problem sets at the end of each chapter. Too often math courses skip this phase of the learning process.

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