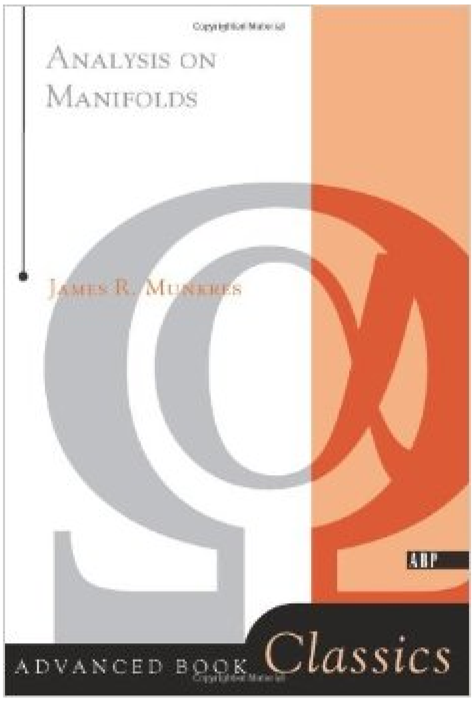
Analysis On Manifolds (Advanced Books Classics)



Synopsis

A readable introduction to the subject of calculus on arbitrary surfaces or manifolds. Accessible to readers with knowledge of basic calculus and linear algebra. Sections include series of problems to reinforce concepts.

Book Information

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Customer Reviews

This book covers a natural extention to my course on analysis in R^n--only content similar to first one sixth of the book got treated at the end of the course. Having read first half (just before manifold) in a continuous fashion (span of nearly a week for 4 hours-ish p.d.), I find this one exceptionally clearly-written, (unlike some point in Spivak’s Calculus on Manifold), and in content it serves as a detailed amplification on Spivak’s (Sp seems to try to keep the proofs elegant and concise more than possible, making a couple of important theorems render indigestible).Other noticeable features are: 1) Mistake-free. 2) Proofs are truncated into stages with explicit objectives in each, making them well-structured on paper and easy to recall in future, and in this way techniques in proofs become highlighted into some elementary theorems (to get most job done) so that the scope of applications are much widened. 3) Motivations scattered throughout the book for integrity. 4) Examples given illustrate as counterexample of how theorem fails with some condition changed or missing. 5) The level of presentation is uniform throughout the book: strictly speaking, only a good single-variable analysis course (Rudin will do, and also helpful to refer to the overlapping topics) and some motivation are needed, all essential concepts of linear algebra, topology are introduced afresh and uniquely and in the favorable context: either indispensible in later proofs (can act as a practice of it) or results proven motivate its introduction and properties, though some knowledge beforehand can help you to appreciate more, and focus on mainbody. 6) Each proof is not necessarily the shortest in methods, you may say, but looks most natural and appropriate at this level.

I've just finished all but the last half of the last section, which deals with abstract manifolds, and I've done most of the problems in the book. It is important to note that the book only deals with manifolds that are subsets of euclidean n-space.Anyway, the book is well-written. It demands some maturity and basic linear algebra, analysis and topology. I found only two misprints which are basically of no consequence. Figures abound and are excellent. I've got only two complaints:(1) The author never mentions that the set of all C^r scalar maps on an open set in R^n is closed under sums, products and quotients. This is used constantly in the latter parts of the book but is never proven. The proof can be found in Spivak's book. The first time this fact is needed is in the proof of the inverse function theorem (det(Df(x)) is a continuous function of x if f is C^r), and also during the construction of a partition of unity. There are more subtle points than this that are left to the reader, but I feel that it should have been proven or given as an exercise if only for the sake of completeness.(2) The book isn't hard (though it isn't totally easy), but the very last section on abstract manifolds seems harder to read than all the rest of the book, because the author does less to elucidate things here of all places, where more elucidation is needed. He's trying in several pages to generalize results on euclidean submanifolds obtained throughout the whole book to abstract manifolds. I feel that the exposition ought to have been much more thorough here, or much more informal, or that this section should have just been completely omitted.Nonetheless I feel I'm now ready to take a course in abstract differentiable manifolds.

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