

**Bibliographic Reference:** Arvanitogeorgos, A. (2015). Geometry of Manifolds [Undergraduate textbook]. Kallipos, Open Academic Editions. http://dx.doi.org/10.57713/kallipos-879

## Abstract

This book is intended for somewhat advanced undergraduate students of mathematics and physics, as well as for corresponding graduate students. The main topic is the theory of differential manifolds and Riemann manifolds. An effort has been made to present the concepts in a simple way and using examples that are useful to mathematicians and physicists. First, some basic concepts (tangent vector, vector field, differential form) are presented in Euclidean space R^n, in a way that makes it easy and natural to generalize them to the manifolds that follow. The theory of differential (smooth) manifolds is then developed, and before Riemannian manifolds, a reference is made to (k,l)-order tensors. Next, we present the basic points of Lie group theory and immediately apply them to Lie group geometry (left-invariante metrics, curvature, etc.). Finally, as a natural consequence, some elements of the theory of homogeneous spaces (Klein geometry) are presented, i.e., a manifold of the form M = G/K, where G is a Lie group and K is a closed Lie subgroup of G.



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