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Sommario/riassunto

This book focuses on the study of the volume of vector fields on Riemannian manifolds. Providing a thorough overview of research on vector fields defining minimal submanifolds, and on the existence and characterization of volume minimizers, it includes proofs of the most significant results obtained since the subject’s introduction in 1986. Aiming to inspire further research, it also highlights a selection of intriguing open problems, and exhibits some previously unpublished results. The presentation is direct and deviates substantially from the usual approaches found in the literature, requiring a significant revision of definitions, statements, and proofs. A wide range of topics is covered, including: a discussion on the conditions for a vector field on a Riemannian manifold to determine a minimal submanifold within its tangent bundle with the Sasaki metric; numerous examples of minimal vector fields (including those of constant length on punctured spheres); a thorough analysis of Hopf vector fields on odd-dimensional spheres and their quotients; and a description of volume-minimizing vector fields of constant length on spherical space forms of dimension three. Each chapter concludes with an up-to-date survey which offers supplementary information and provides valuable insights into the material, enhancing the reader's understanding of the subject. Requiring a solid understanding of the fundamental concepts of Riemannian geometry, the book will be useful for researchers and PhD students with an interest in geometric analysis.