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Nota di contenuto	Preliminaries -- On the existence of algorithms -- Combinatorial and algebraic methods -- Algebraic criteria for geometric realizability -- Geometric methods -- Recent topological results -- Preprocessing methods -- On the finding of polyheadral manifolds -- Matroids and chirotopes as algebraic varieties.
Sommario/riassunto	Computational synthetic geometry deals with methods for realizing abstract geometric objects in concrete vector spaces. This research monograph considers a large class of problems from convexity and discrete geometry including constructing convex polytopes from simplicial complexes, vector geometries from incidence structures and hyperplane arrangements from oriented matroids. It turns out that algorithms for these constructions exist if and only if arbitrary polynomial equations are decidable with respect to the underlying field. Besides such complexity theorems a variety of symbolic algorithms are discussed, and the methods are applied to obtain new mathematical results on convex polytopes, projective configurations and the combinatorics of Grassmann varieties. Finally algebraic varieties characterizing matroids and oriented matroids are introduced providing a new basis for applying computer algebra methods in this field. The necessary background knowledge is reviewed briefly. The text is accessible to students with graduate level background in mathematics, and will serve professional geometers and computer scientists as an introduction and motivation for further research.