Preface

Providing an introduction to both classical and modern techniques in projective algebraic geometry, this monograph treats the geometrical properties of varieties embedded in projective spaces, their secant and tangent lines, the behavior of tangent linear spaces, the algebro-geometric and topological obstructions to their embedding into smaller projective spaces, and the classification of extremal cases. It also provides a solution to Hartshorne's Conjecture on Complete Intersections for the class of quadratic manifolds and new short proofs of previously known results, using the modern tools of Mori Theory and of rationally connected manifolds and following the ideas and methods contained in [103, 104, 154, 156, 160].

The new approach to some of the problems considered can be summarized in the principle that, instead of studying a special embedded manifold uniruled by lines, one analyzes the original geometrical properties of the manifold of lines passing through a general point and contained in the manifold. Once this manifold of lines in its natural embedding, usually of lower codimension, is classified, one tries to reconstruct the original manifold, following a principle which also appears in other areas of geometry such as projective differential geometry and complex geometry.

These classical themes in algebraic geometry enjoyed renewed interest at the beginning of the 1980s, following some conjectures posed by Hartshorne and the discovery by Fulton and Hansen of an important connectedness theorem with new and deep applications to the geometry of algebraic varieties found by Zak, see [44, 69, 70, 198].

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