Título: Points And Lines, Characterizing The Classical Geometries

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Sinopsis

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The classical geometries of points and lines include not only the projective and polar spaces, but similar truncations of geometries naturally arising from the groups of Lie type. Virtually all of these geometries (or homomorphic images of them) are characterized in this book by simple local axioms on points and lines. Simple point-line characterizations of Lie incidence geometries allow one to recognize Lie incidence geometries and their automorphism groups. These tools could be useful in shortening the enormously lengthy classification of finite simple groups. Similarly, recognizing ruled manifolds by axioms on light trajectories offers a way for a physicist to recognize the action of a Lie group in a context where it is not clear what Hamiltonians or Casimir operators are involved. The presentation is self-contained in the sense that proofs proceed step-by-step from elementary first principals without further appeal to outside results. Several chapters have new heretofore unpublished research results. On the other hand, certain groups of chapters would make good graduate courses. All but one chapter provide exercises for either use in such a course, or to elicit new research directions.