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Partial line spaces and algebraic varieties. (English) [Zbl 0616.51019]


[For the entire collection see Zbl 0592.00025.]

This is a survey article summarizing recent results that the Italian school has achieved in the matter of characterizing some special algebraic varieties as partial line spaces (PLS). These last are those pairs \((S, \mathcal{L})\) where \(S\) is a non-empty set and \(\mathcal{L}\) is a proper family of subsets of \(S\) such that: (1) any \(\ell \in \mathcal{L}\) contains at least two points, i.e. \(|\ell| \geq 2\). - (2) \(\mathcal{L}\) is a covering of \(S\). - (3) \(\ell, \ell' \in \mathcal{L}, \ell \neq \ell'\) implies \(|\ell \cap \ell'| \leq 1\).

That general definition allows room for further axioms, leading this approach to characterizations of Grassmann varieties, pseudoproduct spaces and C. Segre’s varieties, Veronese varieties and Schubert varieties. Also, since a graph is a PLS this allows to provide graph theoretical characterizations as well. A large list of references which contain the original development of the topic is provided in the present survey too.

Reviewer: S.Gigena

MSC:

- 51M35 Synthetic treatment of fundamental manifolds in projective geometries (Grassmannians, Veronesians and their generalizations)
- 51-02 Research exposition (monographs, survey articles) pertaining to geometry
- 14M15 Grassmannians, Schubert varieties, flag manifolds

Keywords:
collinear; flag space; double point; bibliography; survey; algebraic varieties; partial line spaces; Grassmann varieties; pseudoproduct spaces; Segre’s varieties; Veronese varieties; Schubert varieties