

Incidence geometries from inner ideals of real simple Lie algebras

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Abstract.

Incidence geometries provide a natural way to study algebraic structures through points, lines and incidence relations. In this poster, we associate incidence geometries with inner ideals of finite-dimensional real simple Lie algebras.

Starting from the extremal geometry of a Lie algebra, we consider a more general geometry whose points are minimal inner ideals and whose lines are inner line ideals, with incidence given by inclusion. Using the classification of inner ideals over the real numbers, we describe the geometries arising from the different real forms.

Depending on the Lie algebra, these geometries may be root shadow spaces, polar spaces, Moufang sets or Moufang quadrangles. In this way, the poster connects the algebraic structure of real simple Lie algebras with classical objects in incidence geometry.