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Sylvester-Gallai Configurations.

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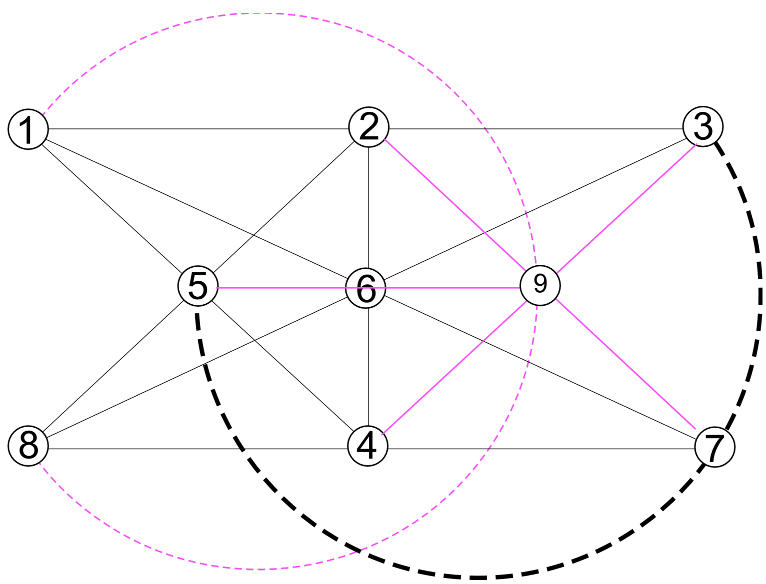
ABSTRACT.

A finite set S of points in an affine or a projective plane over a field k is called a *Sylvester-Gallai* configuration if any line joining a pair of points of S contains at least three points of S. A finite set of *collinear* points in a plane is SG, called the *trivial* configuration.The now famous Sylvester-Gallai theorem states that the any SG-configuration in projective or affine plane over the field of all real numbers is trivial. A powerful consequence of this result is that any attempt to draw a non-trivial SG-configuration in the real plane, there must be at least one straight line which is not straight. Most well-known example of this kind is the familiar 7-point Fano configuration where one always gets at least one circle. By way of contrast, there are algebraically closed fields which admit non-trivial SG-configurations. Also, every finite field admits nontrivial SG-configurations (an example given below). In this talk, we will go through some of the proofs and non-trivial examples and also mention some new directions of research being done in this area.



A non-trivial Sylvester-Gallai Configuration in the Plane PG(2, GF(7)).

References

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