Bernoullis Tafelrunde

Graduate Student Seminar

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Seminarraum 00.003, Spiegelgasse 1

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An introduction to Cayley-Bacharach theorems

Abstract

In the projective plane, a curve C is the zero-set of a homogeneous polynomial P in three variables and when P has degree 3, the curve C is called a cubic. Moreover, we say that two curves C_1 and C_2 meet in a point p if their associated polynomials P_1 and P_2 both vanish at the coordinates of p.

A theorem of Chasles states that, given two cubics in the projective complex plane meeting only in nine distinct points $\{p_1, \ldots, p_9\}$, any other cubic passing a priori through eight of the nine points, for example $\{p_1, \ldots, p_8\}$, passes necessarily through the ninth point p_9.

This is a version of what is called now Cayley-Bacharach theorems. In my talk, after getting into the previous versions of Chasles' theorem and re-explaining all these notions, I will explain a current version of Cayley-Bacharach theorems which extends the result of Chasles.