

CALIFORNIA STATE UNIVERSITY, LONG BEACH

THE MATHEMATICS COLLOQUIUM

presents

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speaking on

Noether's Problem in Algebraic Geometry

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12:00PM-1:00PM

FO3-200A

Abstract: Let k be a field, V be a k -vector space, and G be a subgroup of $GL(V)$ acting almost freely (i.e., freely at a generic point). Denote by $k(V)$ the field of rational functions on V . The starting point for this talk is the following question: Is the field of invariants $k(V)^G$ a pure transcendental extension of k ? This is a very old problem, usually quoted as Noether's problem, and it was raised in connection with the inverse problem of Galois theory. The problem is also closely connected with the famous Luroth problem in algebraic geometry, the problem of characterizing subfields of a field of rational functions.

We will discuss some questions related to the (stable) rationality of quotient varieties V/G . The first examples of nonrational and even nonstably rational varieties V/G were obtained by showing that a birational invariant, the so-called unramified Brauer group, is nontrivial for some series of groups. In fact, this invariant coincides with the cohomological (or Grothendieck's) Brauer group of a smooth projective model for V/G . This obstruction is the first of the series of birational invariants of V/G , the unramified cohomology groups.