

ABSTRACT FOR THE GENERAL PUBLIC.

This proposal is related to several branches of algebra: representations of simple algebraic groups and commutative algebra.

Simple algebraic groups represent basic types of symmetries. Among them are groups of complex matrices of determinant 1, the groups of isometries of n -dimensional complex space and such. It was discovered a long time ago that there exist four infinite series of such groups and five exceptional ones.

Commutative algebra studies coordinate rings of sets defined by polynomial equations. The first part of the proposal is devoted to studying polynomial equations defining certain sets characterized geometrically, in terms of the structure of relations between these equations.

The Principal Investigator found a new link between these theories and he plans to explore it further.

In the second part the Principal Investigator proposes to study certain algebraic objects that proved to be very useful when studying algebraic curves. He and his collaborators used this method to find another proof of an important result of Claire Voisin on equations of algebraic curves.