

# BERNOULLIS TAFELRUNDE

GRADUATE STUDENT SEMINAR

Thursday, 1 November 2018, 12:15-13:00  
Seminarraum 05.002, Spiegelgasse 5

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## Fields of definition and abelian varieties

### ABSTRACT

The goal of this talk will be to give a sketch of the proof of the following theorem.

**Theorem.** *Let  $A$  be an abelian variety over a field  $K$  of characteristic 0 and  $n \geq 2$  an integer such that  $A_{\overline{K}}$  is isogenous to  $C^n$  where  $C$  is a simple abelian variety. For every  $k \in \{1, \dots, n-1\}$  there is an abelian subvariety  $B$  of  $A_{\overline{K}}$  isogenous to  $C^k$  with field of definition  $K_A$ .*

This theorem comes paired with a theorem of Rémond that gives the optimal bound of the degree  $[K_A : K]$ . The field  $K_A$  is a finite extension of  $K$  where the endomorphisms of  $A$  are defined, this will be made clear during the talk.

In order to do that I will first recall some Galois theory and how it can be used to characterize the fields of definition of some objects. The second part will be about the necessary theory on abelian varieties to define the different parts of the statement. I will show some examples arising from elliptic curves to better understand the problem at hand. Finally with the tools mentioned in the talk in place I will sketch the proof of the theorem by giving the general approach and explaining how to turn it into an algebraic problem.