

Seminar: Affine Algebraic Groups

Prof. Dr. Gebhard Böckle

WS 2022

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Timings: Tuesdays, 11 AM-1 PM; INF 205, Room: SR3

Target Group: Bachelor and Master students in Mathematics

Prerequisites: Knowledge of Algebra 1+2 is expected.

About the seminar: The study of *algebraic groups* constitutes a prominent place in mathematical sciences today, having applications in fields such as group theory, algebraic geometry, number theory and mathematical physics. For instance, one of its prominent applications has been to the classification of finite simple groups. This seminar is about one of the building blocks of these groups the *affine algebraic groups*. We will mainly follow the self contained book of W.C. Waterhouse “Introduction to Affine Group Schemes” during the seminar.

We will aim to cover most of the first 16 chapters of the aforementioned book. People studying algebraic groups have studied the same objects in many different guises. The seminar will develop the notions of affine group schemes from a purely category theoretical viewpoint. The first few talks will develop the theory so as to view affine algebraic groups as subobjects of the *general linear group*. The later talks will highlight certain basic properties, like Jordan decomposition and connectedness for affine algebraic groups, or study elementary classes of affine algebraic groups, such as multiplicative or unipotent groups.

By restricting ourselves to the rich topic of affine group schemes, **no** knowledge of algebraic geometry is required. In fact, participation in this seminar may serve to gain an understanding of certain aspects of algebraic geometry.

Vorbesprechung: Tuesday, Sep 30, 2022, 2pm, SR2.

Seminar homepage: Coming soon. Here you will find more details regarding individual talks of the seminar. The homepage will appear in <https://typo.iwr.uni-heidelberg.de/groups/arith-geom/teaching>.