26. For a linear algebraic group $G$, use its comultiplication to define an associative, unital $K$-algebra structure on $A(G)^* = \text{Hom}_K(A(G), K)$ such that the induced Lie algebra structure coincides with the one from left invariant vector fields.

27. Exhibit $\mathbb{G}_m$ as a closed subgroup of $SO_2$. Then find a two-dimensional torus $T \subset SO_4$ and compute the weights for the action induced on the adjoint representation, $T \rightarrow SO_4 \rightarrow \text{GL}(\mathfrak{so}_4)$.

28. Let $A$ be a finite-dimensional, associative and unital $K$-algebra. Show that the group of units is a linear algebraic group. What is its Lie algebra?

29. Show that the differential of the adjoint representation of a linear algebraic group $G$ is given by $\text{ad} := d(\text{Ad})_e : g \rightarrow \text{End}(g), \quad \text{ad}(A)(B) = [A, B]$.

30. Use the last exercise to show that a morphism $\varphi : G \rightarrow H$ of linear algebraic groups induces a homomorphism of Lie algebras $d\varphi_e : g \rightarrow h$.

From Fachschaft Mathematik:

On November 18th, beginning at 18 o’clock the student council will host a plenary assembly for all math students. These topics will be discussed: interim mensa, improvements of examination regulations and local numerus clausus. Further information on these topics is available at the showcase in the auxiliary building as well as on fsmath.uni-bonn.de. Attend numerously!

Contact: David Ploog, room 1.002, dploog@uni-bonn.de
Lectures: Monday, 12.15, large lecture hall Wegelerstraße 10
           Thursday, 14.15, small lecture hall Wegelerstraße 10
Tutorials: Wednesday, 16.15 (Orlando); Friday, 12.30 (Tomasz)