Übungen zu Linear Algebraic Groups — Blatt 1

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Throughout, k is an algebraically closed field.

Exercise 1: Show that the collection of algebraic sets defines a topology on k^n.

Exercise 2: Let X be an affine variety and let $U \subseteq X$ be constructible. Show that U contains a dense open subset of $\overline{U}$.

Exercise 3: Show the following:

(a) U_n is nilpotent and T_n is solvable.

(b) T_n, U_n and D_n are connected.

Exercise 4: Show that GO_{2n}, $n \geq 1$, is not connected when $\mathrm{char}(k) \neq 2$.