

Title

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Let G be a reductive algebraic group scheme, $k = \bar{\mathbb{F}}_p$ with $p > 0$, equipped with the Frobenius map $F : G \rightarrow G$ with F^r its r -fold composition. We defined *Frobenius kernels* $G_r := \ker F^r$, which are in correspondence with the cocommutative Hopf algebras $\text{Dist}(G_r)$.

Goal: We want to classify simple G_r -modules, and to do this we'll use socles.

We have a maximal torus $T \subseteq G$ and thus $T_r \subseteq G_r$ after acting by Frobenius. This yields a SES

$$0 \rightarrow p_r X(T) \rightarrow X(T) \rightarrow X(T)/p^r X(T) = X(T_r) \rightarrow 0.$$