Finite subgroups of $\mathrm{SL}_n(F[t])$ in characteristic 0

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Abstract

Let F be a field of characteristic 0, $F[t]$ the corresponding polynomial ring and G the matrix group $\mathrm{SL}_n(F[t])$. Denote by $F((1/t))$ the field of Laurent series in $1/t$, which is the completion of the rational function field $F(t)$ with respect to the discrete valuation which has $1/t$ as its prime element. Letting G act on the Bruhat-Tits building X of the group $\mathrm{SL}_n(F((1/t)))$ and applying the Bruhat-Tits fixed point theorem, one can show that every finite subgroup of G is conjugate to a subgroup of $\mathrm{SL}_n(F)$. For certain fields F, like the field $\mathbb{Q}_p$ of p-adic numbers, this implies that G has only finitely many conjugacy classes of finite subgroups. The same result holds if SL_n is replaced with a reductive group which is defined over F.