Abstract: Let $X \hookrightarrow \mathbb{P}^r$ be a smooth projective variety defined by homogeneous polynomials of degree $\leq d$ over an algebraically closed field $k$. Let $\text{Pic} X$ be the Picard scheme of $X$, and $\text{Pic}^0 X$ be the identity component of $\text{Pic} X$. The Néron–Severi group scheme of $X$ is defined by $\text{NS} X = (\text{Pic} X)/(\text{Pic}^0 X)_{\text{red}}$, and the Néron–Severi group of $X$ is defined by $\text{NS} X = (\text{NS} X)(k)$. We give an explicit upper bound on the order of the finite group $(\text{NS} X)_{\text{tor}}$ and the finite group scheme $(\text{NS} X)_{\text{tor}}$ in terms of $d$ and $r$. As a corollary, we give an upper bound on the order of the torsion subgroup of second cohomology groups of $X$ and the finite group $\pi^1_{\text{et}}(X, x_0)_{\text{ab}}$. We also show that $(\text{NS} X)_{\text{tor}}$ is generated by $(\deg X - 1)(\deg X - 2)$ elements in various situations.

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