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Stellingen

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“A monodromy criterion for existence of Néron models and a result on semi-factoriality”

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1. Let A/k be an abelian variety over a field of characteristic zero, S a regular k -scheme, and $\pi: S' \rightarrow S$ a proper birational k -morphism. Every k -morphism $S' \rightarrow A$ factors via π .
2. Let S be a reduced, locally noetherian, geometrically unibranch \mathbb{Q} -scheme, and let $U \subset S$ be an open dense. Let G/S be a smooth group scheme of finite type, with semi-abelian identity component G^0 . Let H/U be a smooth subgroup scheme of G_U . Then the schematic closure $\overline{H} \subset G$ is an S -smooth subgroup scheme of G .
3. Let S be a regular, locally noetherian \mathbb{Q} -scheme, $D \subset S$ a regular divisor, $U = S \setminus D$ and A/U an abelian scheme with a semiabelian model \mathcal{A}/S . The abelian scheme A admits a Néron model over S .
4. Let S be a regular, locally noetherian scheme, $D \subset S$ a regular divisor, $U = S \setminus D$ and C/U a smooth curve with a nodal model \mathcal{C}/S . The jacobian $Jac_{C/U}$ admits a Néron model over S .
5. Let S be a regular, locally noetherian, excellent \mathbb{Q} -scheme, D a normal crossing divisor on S , $\mathcal{C} \rightarrow S$ and $\mathcal{D} \rightarrow S$ two nodal curves, smooth over $U = S \setminus D$. Assume that over the generic point $\eta \in S$, there exists an isogeny

$$\mathrm{Pic}_{\mathcal{C}_\eta/\eta}^0 \rightarrow \mathrm{Pic}_{\mathcal{D}_\eta/\eta}^0.$$

Then $\mathrm{Pic}_{\mathcal{C}_U/U}^0$ admits a Néron model over S if and only if $\mathrm{Pic}_{\mathcal{D}_U/U}^0$ does.

6. Let S be a regular, locally noetherian scheme, C/S an aligned curve with regular total space C , admitting a section $\sigma: S \rightarrow C$. Let $U \subset S$ be an open dense, such that C_U is smooth over U , and let \mathcal{N}/S be the Néron model of $\mathrm{Pic}_{C_U/U}^0$. Let \mathcal{E} be a line bundle on C and $J_{\mathcal{E}}^g/S$ be the compactified jacobian of C/S constructed by Esteves. Denote by $J \subset J_{\mathcal{E}}^g$ the open subspace parametrizing line bundles (equivalently, the S -smooth locus of $J_{\mathcal{E}}^g$). Then the natural S -morphism $J \rightarrow \mathcal{N}$ is an isomorphism.

7. Let S be the spectrum of a discrete valuation ring, with generic point η . Let \mathcal{C}/S be a nodal curve, and $\mathcal{C}' \rightarrow \mathcal{C}$ the blow-up at a closed point of \mathcal{C} . Then:

i) the induced morphism $\text{Pic}_{\mathcal{C}/S} \rightarrow \text{Pic}_{\mathcal{C}'/S}$ is étale.

Let $e: \text{Spec } k(\eta) \rightarrow \text{Pic}_{\mathcal{C}_\eta/k(\eta)}$ be the unit section. Denote by $\text{cl}(e)$ (resp. $\text{cl}'(e)$) its schematic closure inside $\text{Pic}_{\mathcal{C}/S}$ (resp. inside $\text{Pic}_{\mathcal{C}'/S}$).

ii) the induced morphism between the fppf-quotients $\frac{\text{Pic}_{\mathcal{C}/S}}{\text{cl}(e)} \rightarrow \frac{\text{Pic}_{\mathcal{C}'/S}}{\text{cl}'(e)}$ is an open immersion.

8. Let S be the spectrum of a discrete valuation ring, \mathcal{C}/S a nodal curve, and $\mathcal{C}' \rightarrow \mathcal{C}$ the blowing-up of \mathcal{C} at a closed point. Let \mathcal{L} be a line bundle on \mathcal{C}' such that its restriction to every irreducible component of the exceptional locus of π has degree zero. Then $\pi_*\mathcal{L}$ is a line bundle on \mathcal{C} and the natural morphism of $\mathcal{O}_{\mathcal{C}'}$ -modules $\pi^*\pi_*\mathcal{L} \rightarrow \mathcal{L}$ is an isomorphism.