



Universiteit
Leiden
The Netherlands

Néron models in high dimension: Nodal curves, Jacobians and tame base change

Poiret, T.

Citation

Poiret, T. (2020, October 20). *Néron models in high dimension: Nodal curves, Jacobians and tame base change*. Retrieved from <https://hdl.handle.net/1887/137218>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/137218>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/137218> holds various files of this Leiden University dissertation.

Author: Poiret, T.

Title: Néron models in high dimension: nodal curves, Jacobians and tame base change

Issue date: 2020-10-20

Contents

I	Nodal curves, dual graphs and resolutions	1
1	Local structure of nodal curves and their dual graphs	1
1.1	First definitions	1
1.2	The local structure	2
1.3	The dual graph at a geometric point	2
1.4	Quasisplitness, dual graphs at non-geometric points	3
2	Primality and base change	5
3	Sections of nodal curves	8
3.1	Type of a section	8
3.2	Admissible neighbourhoods	11
4	Refinements and resolutions	12
4.1	Arithmetic complexity and motivation for refinements	12
4.1.1	Arithmetic complexity	12
4.1.2	Factoriality of completed étale local rings	13
4.1.3	Factoring sections through the smooth locus	14
4.2	Refinements of graphs	14
4.3	Refinements of curves	15
4.4	Resolutions of nodal curves	18
II	Néron models of nodal curves and their Jacobians	20
5	Generalities about Néron models	20
5.1	Definitions	20
5.2	Base change and descent properties	21
5.3	Schemes vs algebraic spaces	23
6	Néron models of Jacobians	24

6.1	Alignment and its relation to the Picard space	24
6.1.1	Definition and examples	24
6.1.2	Alignment and Néron models	26
6.2	Étale-universally prime elements	29
6.3	Strict alignment is necessary and sufficient for Néron models to exist	31
6.3.1	The necessity of strict alignment	31
6.3.2	Fiberwise-disconnecting locus of nodal curves and closure of the unit section of the Picard scheme	32
6.3.3	The main theorem	35
7	Néron models of curves with nodal models	36
7.1	Factoring sections through refinements	37
7.2	First construction of the ns-Néron model	39
7.3	Exceptional components and minimal proper regular models	43
7.3.1	Definition	43
7.3.2	The minimal proper regular model	44
7.3.3	Van der Waerden's purity theorem	44
7.4	Contractions and stable models	46
7.4.1	The stack of n-pointed stable curves and the contraction morphism	47
7.4.2	The stable model	48
7.4.3	Rational components of the stable model	49
7.4.4	Singular ideals of the stable model	52
7.4.5	The main theorem	54
7.5	Separatedness of the ns-Néron model	54
III	Base change of Néron models along finite tamely ramified maps	59
8	Motivation	59
9	Prerequisites	60

9.1 Weil restrictions	60
9.2 Fixed points	61
9.3 Twisted Lie algebras	62
10 The morphism of base change for tame extensions	63
10.1 Compatibility with Weil restrictions	63
10.2 A filtration of the Néron model over the canonical stratification .	66
Bibliography	71
Acknowledgements	73
Abstract	74
Samenvatting	75
Résumé	76
Résumé substantiel	77
Curriculum Vitae	82
Correspondence	83

