

Number Theory Schedule, Fall 2018, version 2

Our goal will be to read and understand the paper “Revisiting the de Rham-Witt Complex” [1], which give a self-contained and relatively simple construction of the de Rham Witt complex and hence of crystalline cohomology.

Date	Topics	Sections and pages	Name
Aug. 29	Introduction and Overview	1.1–1., pp. 1–11	Arthur Ogus
Sep. 5	Review: de Rham complex Cartier isomorphism	[2] [3] [6] [4]	Alex Youcis
Sep. 12	Witt vectors Dieudonné complexes Saturation	[5] [4] 2.1–2.4 pp. 12–17	Daniel Bragg
Sep. 19	Completions, strictness, Dieudonné Towers	2.5–2.9 pp. 19–27	Ravi Fernando
Sept. 26	Dieudonné Algebras the de Rham complex Saturated Dieudonné Algebras	3.1–3.3 pp. 28–35 3.4–3.5, pp. 35–38	Ravi Fernando Rahul Dalal
Oct. 3	Comparison with Witt vectors Construction of $\mathcal{W}\Omega_R^*$ Comparison with de Rham complex	3.6, pp. 38–41 4.1–4.3, pp. 44–48	Joe Stahl
Oct. 10	The classical de Rham Witt complex Zariski localization	4.4, pp 49–54 5.1–5.2, pp. 55– 60	Ian Gleason
Oct. 17	Etale localization	5.3–5.5, pp. 61–70	Ravi Fernando
Oct. 24	Calculation: the case of a cusp *	6.2–6.6, pp. 71–79	Joe Stahl
Oct. 31	Derived category version: fixed points of $L\eta$	7.1–7.3, pp. 80–88	Koji Shimizu
Nov. 7	The Nygaard filtration	8.1–8.4, pp. 99–107 [7]	TBD
Nov. 14	p -adic Hodge theory: $A\Omega$ and main statement	10.1–10.2 pp. 124–133	Alex Youcis
Nov. 21	No meeting		—
	Small open sets Proof of the theorem	10.3–10.4, pp. 133–137	Ravi Fernando

* We may want to skip this to provide more time for later topics.

References

- [1] B. Bhatt, J. Lurie, and A. Matthew. Revisiting the de Rham Witt complex. arXiv:1804.05501v1.
- [2] A. Grothendieck. On the de Rham cohomology of algebraic varieties. *Publications Mathématiques de l'I.H.É.S.*, 29(1):351–359, 1966.
- [3] R. Hartshorne. On the de Rham cohomology of algebraic varieties. *Publications Mathématiques de l'I.H.É.S.*, 45:1–99, 1976.
- [4] L. Illusie. Complexe de de Rham Witt et cohomologie cristalline. *Ann. Math. E.N.S.*, 12:501–601, 1979.
- [5] A. Joyal. δ -anneaux et λ -anneaux. *C. R. Math. Rep. Acad. Sci. Canada*, 7(4):227–232, 1985.
- [6] Nicholas Katz. Algebraic solutions of differential equations (p -curvature and the Hodge filtration). *Inventiones Mathematicae*, 18:1–118, 1972.
- [7] N. Nygaard. Slopes of powers of Frobenius on crystalline cohomology. *Ann.Sci. École Norm. Sup.*, 14(4):369–401, 1982.