

Fontaine, J.-M.; Illusie, L.

p-adic periods: A survey. (English) [Zbl 0836.14010](#)

Ramanan, S. (ed.) et al., Proceedings of the Indo-French conference on geometry held in Bombay, India, 1989. Delhi: Hindustan Book Agency. 57-93 (1993).

The classical period map is defined for a complete smooth variety X over \mathbb{C} , and it gives an isomorphism $H_{\text{DR}}^*(X/\mathbb{C}) \otimes \mathbb{Q} \xrightarrow{\sim} H^*(X(\mathbb{C}), \mathbb{Q}) \otimes \mathbb{C}$. The p -adic period map is defined for a complete smooth variety X over the field of fractions K of a complete discrete valuation with perfect residue field of characteristic p , and it relates the de Rham cohomology of X (together with its additional structure) to the p -adic étale cohomology of X (together with the action of $\text{Gal}(K^{\text{al}}/K)$); it is assumed that K has characteristic zero. There is a sequence of successively more precise conjectures, due to the author, that describe what should be true concerning the p -adic period map for a general X , for an X with semistable reduction, and for an X with good reduction. These conjectures have now largely been proved, thanks to the effort of Bloch, Faltings, Fontaine, Hyodo, Kato, Messing, and others.

This article gives a description of the conjectures and results. Except that it is more detailed, and does not discuss proofs, it covers much the same ground as Illusie's Bourbaki talk [*L. Illusie* in: Sémin. Bourbaki, Vol. 1989/90, Astérisque 189-190, Exp. No. 726, 325-374 (1990; [Zbl 0736.14005](#))].

For the entire collection see [[Zbl 0830.00028](#)].

Reviewer: [J.Milne \(MR 95e:14013\)](#)

MSC:

- [14F30](#) p -adic cohomology, crystalline cohomology
- [14F40](#) de Rham cohomology and algebraic geometry
- [32G20](#) Period matrices, variation of Hodge structure; degenerations
- [11G25](#) Varieties over finite and local fields
- [14G20](#) Local ground fields in algebraic geometry

Cited in **5** Documents

Keywords:

adic étale cohomology; p -adic period map; de Rham cohomology