Séminaire de théorie des nombres

Le 07 décembre 2020 à 14h (BigBlueButton)

Periods and Dwork's congruences

Exposé de Frits Beukers
(Utrecht)

Résumé : Consider the hypergeometric series $F(t) := F(1/2, 1/2, 1|t)$. For any positive integer m we define $F_m(t)$ as the truncation at t^m, i.e we drop all terms in $F(t)$ of degree $\geq m$. Let p be an odd prime and z_0 a p-adic integer$\neq 0, 1$. Then Dwork found that if $F_p(z_0)$ is a unit in $\mathbb{Z}_p$, the quotient $F_{p^s}(z_0)/F_{p^{s-1}}(z_0)$ converges p-adically to $(-1)(p-1)/2$ times the zero of the ζ-function of the elliptic curve

$$y^2 \equiv x(x-1)(x-z_0) \bmod p$$

with p-adic valuation 1. There exist many far reaching generalizations.

In two recent papers, Dwork-crystals I,II (arXiv :1903.11155, arXiv :1907.10390) Masha Vlasenko and I have developed an elementary framework which explains many of these phenomena. In this lectures I would like to present some of the ideas.