Department of Mathematics, BGU

AGNT

On *Tuesday, November ,8 2022*

At *12:40 − 13:40*

In *201*

Yotam Hendel (Université de Lille)

will talk about

On unfiorm number theoretic estimates for fibers of polynomial maps over finite rings of the form Z/p^kZ

Abstract: Let $f:X \to Y$ be a morphism between smooth, geometrically irreducible Z-schemes of finite type. We study the number of solutions $\#\{x:f(x)=y \mod p^k\}$ for prime p, positive number k, and $y \in Y(Z/p^kZ)$, and show that the geometry and singularities of the fibers of f determine the asymptotic behavior of this quantity as p, k and y vary.

In particular, we show that $f:X \to Y$ is flat with fibers of rational singularities, a property abbreviated (FRS), fi and only fi $\#\{x:f(x)=y \mod p^k\}/p^{k(\dim X - \dim Y)}$ is unfiormly bounded in p, k and y. We then consider a natural family of singularity properties, which are variants of the (FRS) property, and provide for each member of this family a number theoretic characterization using the asymptotics of $\#\{x:f(x)=y \mod p^k\}/p^{k(\dim X - \dim Y)}$.

To prove our results, we use model theoretic tools (and in particular the theory of motivic integration, in the sense of unfiorm p-adic integration) to effectively study the collection $\{\#\{x:f(x)=y \mod p^k\}/p^{k(\dim X -\dim Y)}\}$. If time allows, we will discuss these methods.

Based on a joint work with Raf Cluckers and Itay Glazer.

Please Note the Unusual Place!