
Number Theory by Early Career Researchers
Théorie des nombres par des chercheurs en début de carrière
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Rigid Cocycles and the p -adic Kudla Program

Rigid cocycles, introduced by Darmon and Vonk in 2017, offer a promising framework to extend complex multiplication theory to real quadratic fields, suggesting a theory of “real multiplication.” They exhibit striking parallels with modular forms and are central to the emerging p -adic Kudla program. While the classical Kudla program studies the theta correspondence between automorphic forms on different groups, the p -adic version appears to replace automorphic forms with rigid cocycles. Although a theory for a p -adic theta correspondence has yet to be developed, recent results suggest its existence. In this talk, I present some of these p -adic results, draw comparisons to the classical setting, and discuss the evidence for an underlying p -adic theta correspondence.

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Diophantine tuples and Diophantine powersets

Let k, n be integers with $k \geq 2$ and $n \neq 0$. A set A of positive integers is a Diophantine tuple with property $D_k(n)$ if the product of $ab+n$ is a perfect k -th power for every $a, b \in A$ with $a \neq b$. These Diophantine tuples have been studied extensively. In this talk, I will discuss some recent progress on "Diophantine powersets" (first studied by Gyarmati, Sárközy, and Stewart), where we allow $ab+n$ to be a perfect power instead of a perfect k -th power for some fixed k . Joint work with Ernie Croot.

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