

Number Theory Seminar

NMAG470

October 29 at 15:40 in K9

Explicit Effective Diophantine Approximation

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Diophantine problems go back to the early days of civilisation. Our earliest written evidence of such problems is found on the famous Babylonian clay tablet, Plimpton 322, dating back to 1800BC. Diophantine problems continue to play an important role up to the present day with the use of elliptic curves in cryptography.

There are several categories of diophantine results. We speak of qualitative, quantitative, effective and explicit effective results.

In this lecture, we focus on the last of these: explicit effective results.

Under certain conditions, we can obtain very good explicit bounds on how well we can approximate some interesting irrational numbers by rational numbers. E.g.,

$$\left| 2^{1/3} - \frac{p}{q} \right| > \frac{1}{4|q|^{2.4325}}$$

for all $p, q \in \mathbb{Z}$ with $q \neq 0$ (and find your name in the latest edition of Hardy & Wright's classic text, as a result). One can do the same for other irrational numbers like $\log(2)$, π , ... too.

Moreover, one can obtain such results in a simple, easy to understand way. That is the goal of this lecture: providing a clear presentation of such techniques. It will be accessible to graduate students, and even enthusiastic advanced undergraduates, while also providing insights into the latest and best-known results in this area.

Web seminář:

sites.google.com/site/vitakala/teaching/number-theory-seminar