Leibniz Universität Hannover

Oberseminar für Arithmetische Geometrie und Zahlentheoriee

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Triples, quadruples and quintuples which are $D(n)$-sets for several n's.

For an integer n, a set of distinct nonzero integers a1, a2, ... , am such that $a_i a_j + n$ is a perfect square for all $1 <= i < j <= m$, is called a Diophantine m-tuple with the property $D(n)$ or simply a D(n)-set. $D(1)$-sets are known as Diophantine m-tuples. The first Diophantine quadruple, the set $\{1, 3, 8, 120\}$ was found by Fermat. He, Togbe and Ziegler proved recently that there does not exist a Diophantine quintuples. On the other hand, it is known that there exist infinitely many rational Diophantine sextuples. When considering $D(n)$-sets, usually an integer n is fixed in advance. However, we may ask if a set can have the property $D(n)$ for several different n's. For example, 8,21,55 is a $D(1)$-triple and $D(4321)$-triple. In a joint work with Adzaga, Kreso and Tadic, we presented several families of Diophantine triples which are $D(n)$-sets for two distinct n's with $n <> 1$. In a joint work with Petricevic we proved that there are infinitely many (essentially different) quadruples which are simultaneously $D(n1)$-quadruples and $D(n2)$-quadruples with $n1 <> n2$. Morever, the elements in some of these quadruples are squares, so they are also $D(0)$-quadruples. E.g. $\{54^2, 100^2, 168^2, 364^2\}$ is a $D(8190^2)$, $D(40320^2)$ and $D(0)$-quadruple. In this talk, we will describe methods used in constructions of mentioned triples and quadruples. We will also mention a recent joint work in with Kazalicki and Petricevic on D(n)-quintuples with square elements (so they are also $D(0)$-quintuples). There are infinitely many such quintuples. One example is a $D(480480^2)$-quintuple $225^2, 286^2, 819^2, 1408^2, 2548^2$.

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Alle Interessierten sind herzlich eingeladen.