UNIVERSITÄT SALZBURG

Fachbereich Mathematik
Hellbrunnerstraße 34
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Gastvortrag

Montag, 20. April 2015
13.15 Uhr
Seminarraum II

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Powers in products of terms of Recurrence Sequences

Abstrakt:

It is known that there are only finitely many perfect powers in non degenerate binary recurrence sequences. However explicitly finding them is an interesting and a difficult problem for a number of binary recurrence sequences. A recent breakthrough result of Bugeaud, Mignotte and Siksek states that Fibonacci sequences $(F_n)_{n\geq 0}$ given by $F_0 = 0,\ F_1 = 1$ and $F_{n+2} = F_n + F_{n+1}$ and for $n \geq 0$ are perfect powers only for $F_0 = 0,\ F_1 = 1,\ F_2 = 1,\ F_6 = 8$ and $F_{12} = 144$.

In this talk, we consider another well known Pell and Pell-Lucas sequence. The Pell sequence $(u_n)_{n=0}^{\infty}$ is given by the recurrence $u_n = 2u_{n-1} + u_{n-2}$ with initial condition $u_0 = 0, u_1 = 1$ and its associated Pell-Lucas sequences $(v_n)_{n=0}^{\infty}$ is given by the recurrence $v_n = 2v_{n-1} + v_{n-2}$ with initial condition $v_0 = 2, v_1 = 2$.

Let n, d, k, y, m be positive integers with $m \geq 2,\ y \geq 2$ and $\gcd(n, d) = 1$. We prove that the only solutions of the Diophantine equation $u_n u_{n+d} \cdots u_{n+(k-1)d} = y^m$ are given by $u_7 = 13^2$ and $u_1 u_7 = 13^2$ and the equation $v_n v_{n+d} \cdots v_{n+(k-1)d} = y^m$ has no solution. In fact we prove a more general result. This is a joint work with Bravo, Das and Guzman. I will also talk about some related results on joint work with Maibam and Ngairangbam.

Einladender: Clemens Fuchs