

Online Number Theory Seminar

25 February 2022. – 17:00-17:50

Ákos Pintér: On power values of pyramidal numbers

For $m \geq 3$, we define the m th order pyramidal number by $\text{Pyr}_m(x) = (1/6)x(x+1)((m-2)x+5-m)$. In a previous paper written by Dujella, Győry and the speaker all solutions to the equation $\text{Pyr}_m(x) = y^2$ are found in positive integers x and y , for $3 \leq m \leq 100$ with $m \neq 5$. In this talk we consider the question of higher powers, and find all solutions to the equation $\text{Pyr}_m(x) = y^n$ in positive integers x, y and n , with $n \geq 3, 3 \leq m \leq 50$. We reduce the problem to a study of systems of binomial Thue equations, and use a combination of local arguments, the modular method via Frey curves, and bounds arising from linear forms in logarithms. Joint work with Andrej Dujella, Kálmán Győry and Philippe Michaud-Jacobs.