Online Number Theory Seminar

23 May 2025. – 17:00-17:50

V. Ziegler: On the unique solvability of simultaneous Pell equations.

In this talk we consider the system of simultaneous Pell equations

$$x^2 - ay^2 = 1,$$

$$z^2 - bx^2 = 1,$$

where $a > b \geq 2$ are positive integers. We describe a procedure which, for any fixed $b$, either confirms that the system of simultaneous Pell equations has at most one solution in positive integers $(x, y, z)$, or finds all exceptions for which the system has at least two solutions in positive integers $(x, y, z)$. In particular, we will discuss the case that $b = 24$.