

Online Number Theory Seminar

12 May 2023. – 17:00-17:50

Maohua Le, Reese Scott and Robert Styer: New advances in the study of the ternary purely exponential Diophantine equation $a^x + b^y = c^z$

Let a, b, c be fixed coprime positive integers greater than 1, and let $N(a, b, c)$ denote the number of positive integer solutions (x, y, z) of the equation $a^x + b^y = c^z$. In the past hundred years, although there have been very rich results on the upper bound for $N(a, b, c)$, some key problems in this area still poorly understood. In 2016, R. Scott and R. Styer conjectured that $N(a, b, c) \leq 1$, except with a few known exceptional cases. This is a difficult problem that is still far from being solved. In 2019, Y.-Z. Hu and M.-H. Le proved that if $\max\{a, b, c\} > 10^{62}$, then $N(a, b, c) \leq 2$. Afterwards, T. Miyazaki and I. Pink eliminated the condition $\max\{a, b, c\} > 10^{62}$ from the above result. Now, we present the new advances of the above conjecture. Joint work with Reese Scott and Robert Styer.