# Sophia University
# Mathematics Colloquium

**When:** Friday, October 25, 2019, 17:30－18:30

**Where:** Room No. 398, Bldg.4, Yotsuya-Campus

**Speaker:** Wataru Takeda (Nagoya University)

**Title:** Highly divisible sequence represented as homogeneous polynomials

**Abstract:**

The Brocard-Ramanujan problem, which is an unsolved problem in number theory, is to find integer solutions $(x, n)$ of $x^2 - 1 = n!$. Brocard and Ramanujan conjectured that there are only three solutions $(x, n) = (5, 4), (11, 5)$ and $(71, 7)$ of $x^2 - 1 = n!$ independently. As one of its generalizations, it is studied whether there exist only finitely many solutions of $P(x) = H_n$, where $H_n$ is called "highly" divisible sequence. In this talk, we choose the following functions as $H_n$,

- $H_n = n!$.
- $H_n = [1, 2, ..., n]$,

  where $[1, 2, ..., n]$ is the least common multiple of all positive integers less than or equal to $n$.
- $H_n = p_1 p_2 \cdots p_n$,

  where $2 = p_1 < p_2 < \cdots < p_n < \cdots$ is the sequence of all primes.

Also, we consider more general equation $F(x, y) = H_n$, where $F(x, y)$ is a homogeneous polynomial with integer coefficients, and study the number of $n$ such that $H_n$ is represented as $F(x, y)$.

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