The SUMO Speaker Series for Undergraduates

(Pizza Provided)
Wednesday, October 26th
4:15-5:05, room 380C

The Number of Ways of Expressing a Number as a Binomial Coefficient

Professor Daniel Kane

$$
\begin{array}{ccccccccccc}
 & & & & & 1 & & & & & \\
 & & & & 1 & & 1 & & & & \\
 & & & 1 & & 2 & & 1 & & & \\
 & & 1 & & 3 & & 3 & & 1 & & \\
 & 1 & & 4 & & 6 & & 4 & & 1 & \\
1 & & 5 & & 10 & & 10 & & 5 & & 1
\end{array}
$$

ABSTRACT:

10 is both a triangular number and a tetrahedral number. This is because 10 is both 5 choose 2 and 5 choose 3. When seen this way, this identity seems to hold for fairly mundane reasons, but there are other more interesting equalities between binomial coefficients.

An infinite family of numbers can be found that can each be written as a binomial coefficient in at least 6 ways, and the number 3003 can be written as a binomial coefficient in 8 ways. The question of whether there are any numbers that can be written in more ways as a binomial coefficient is a difficult one. We discuss some results on bounds on the number of ways a given integer can be expressed as a binomial coefficient.

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