

# Permutations of $\{1, \dots, n\}$ and related permanents

Zhi-Wei Sun

Department of Mathematics, Nanjing University  
Nanjing 210093, P. R. China  
*E-mail:* zwsun@nju.edu.cn

## Abstract

In this talk we introduce recent results on permutations of  $\{1, \dots, n\}$ . For example, we show that for any positive integer  $n$  there is a unique permutation  $\pi \in S_n$  such that all the numbers  $k + \pi(k)$  ( $k = 1, \dots, n$ ) are powers of two.

We also mention some divisibility properties of the permanent

$$\text{per}[i^{j-1}]_{1 \leq i, j \leq n} = \sum_{\sigma \in S_n} \prod_{i=1}^n i^{\sigma(i)-1},$$

as well as related applications to groups.

We also introduce some open conjectures of the speaker, one of which states that for any integer  $n > 6$  there is a permutation  $\pi \in S_n$  such that

$$\sum_{k=1}^{n-1} \frac{1}{\pi(k) + \pi(k+1)} = 1.$$