



# 北京理工大学

## 2024 TALKS IN COMBINATORICS



Imre Bárány is a Hungarian mathematician at the Alfréd Rényi Institute of Mathematics of the Hungarian Academy of Sciences (MTA) and the department of mathematics at University College London, working in combinatorics and discrete geometry. He received the Mathematical Prize (now Paul Erdős Prize) of the MTA in 1985. He was

an invited speaker at the Combinatorics session of ICM in Beijing 2002, an Erdős Lecturer at Hebrew Univ of Jerusalem in 2004, and elected a corresponding (2010) and full (2016) member of the MTA. He became a fellow of the AMS since 2012, and a member of the Academia Europaea since 2021. Professor Bárány is an editor-in-chief for *Combinatorica*, an editorial board member for *Mathematika* and *Online Journal of Analytic Combinatorics*, and an area editor for *Mathematics of Operations Research*.

### The Steinitz lemma and its matrix version

The Steinitz lemma, a classic from 1913, states that a sequence of (at most) unit vectors in  $\mathbb{R}^d$  whose sum is the origin can be rearranged so that every partial sum of the rearranged sequence has norm at most  $2d$ . It is an important result with several applications. I plan to mention a few. In the matrix version of the Steinitz lemma,  $A$  is a  $k$  by  $n$  matrix whose entries are unit vectors in  $\mathbb{R}^d$  and their sum is the origin. Oertel, Paat and Weismantel proved recently that there is a rearrangement of row  $j$  of  $A$  (for every  $j$ ) such that the sum of the entries in the first  $m$  columns of the rearranged matrix has norm at most  $40d^5$  for every  $m$ . We improve this bound to  $4d - 2$ .

2024.09.13 (Fri) 1.50-2.50 pm, Wencui E 205

Invited by Guoliang Wang (glw@bit.edu.cn)