

Colloquium on Combinatorial Designs

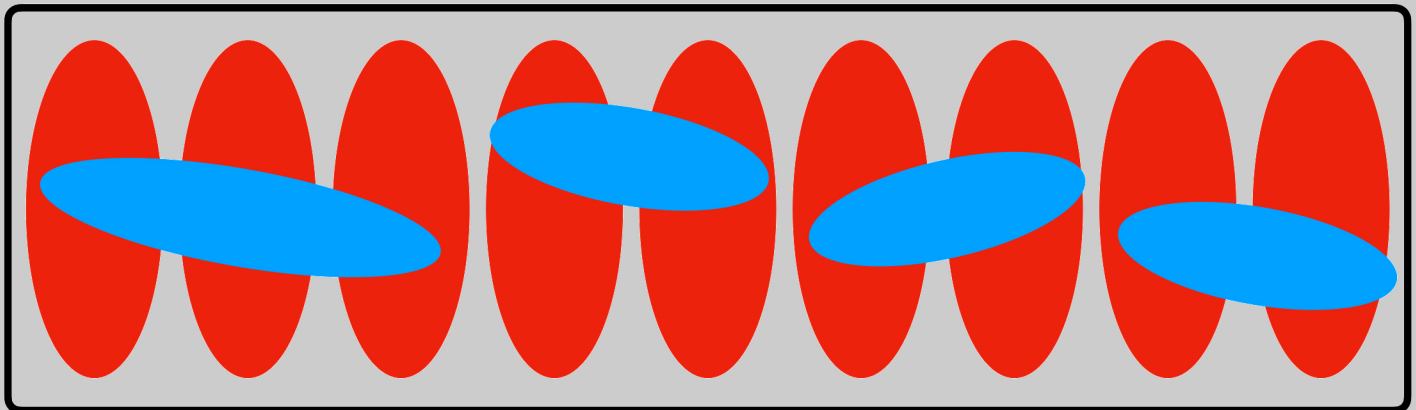
2022.9.24 14:30-17:30

Link: <https://meeting.tencent.com/dm/alU67XIrRKXD>

ID: 320-839-400

Password: 3264

$PG(k-1, q^m)$



L_{U_1}

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Invited Speakers

Jiange Li A Combinatorial Approach to Some
Distribution-free Probabilistic Inequalities

Alessandro Neri One-weight Codes in Various Metrics

Chen Yuan New Bounds for Thresholds of Code Ensembles

Organisers: Tao Feng, Chong Shangguan, Xiande Zhang, Yue Zhou

Colloquium on Combinatorial Designs

Organized by Tao Feng, Chong Shangguan, Xiande Zhang
and Yue Zhou

September 24, 2022

Information

Our 9th colloquium will be held via Tencent Voov meeting on 24th September 2022 from 14:30 to 17:30. It consists of three invited talks, each of which will take around 1 hour. There will be a 5-minutes break between every two talks.

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Abstracts

A combinatorial approach to some distribution-free probabilistic inequalities

24 September
14:30

Jiange Li

Harbin Institute of Technology, China

This talk is focused on the comparison between the probabilities that the sum and difference of two independent, identically distributed random elements take values in very general sets. We prove these distribution-free probabilistic inequalities by showing that underlying them are inequalities of extremal combinatorial nature, related among other things to classical sphere packing/covering problems.

One-weight codes in various metrics

24 September
15:30

Alessandro Neri

Max Planck Institute for Mathematics in the Sciences, Germany

In this talk we analyze one-weight codes in different metrics, focusing on the Hamming, the rank and the sum-rank metric. Bonisoli showed in 1984 that the only one-weight code – up to equivalence and repetition – in the Hamming metric is the simplex code. The classification of one-weight codes in the rank metric is more recent and due to Randrianarisoa in 2019, and also in this case the code is unique up to equivalence. We will generalize these two constructions in order to obtain one-weight codes in the sum-rank metric. However, this produces several inequivalent one-weight codes, showing how different the behaviour is in this metric. The main idea to obtain these results is using geometric characterizations for codes in all the three metrics.

This is a joint work with Paolo Santonastaso and Ferdinando Zullo [1].

[1] A. Neri, P. Santonastaso, F. Zullo. The geometry of one-weight codes in the sum-rank metric, preprint, arXiv:2112.04989, 2021.

New Bounds for Thresholds of Code Ensembles

Chen Yuan

Shanghai Jiao Tong University, China

I will first present some background for the threshold rate of random code and random linear code. After this, I will prove new results concerning combinatorial properties of random linear codes. By applying the thresholds framework from Mosheiff et al (FOCS 2020), I will derive fine-grained results concerning the list-decodability and ϵ -recoverability of random linear codes. The first result is a lower bound on the list-size required for random linear codes over F_q ϵ -close to capacity. This is analogous to a lower bound for list-decoding that was recently obtained by Mosheiff et al (RANDOM 2020). Then, I will provide other results about list-decoding with constant list-sizes. Specifically, A tight upper and lower bounds were obtained on the rate required for binary random linear code of list size 3 and 4 and q -ary random linear code of list size 2.
