数学天空 Pop-up salon

- **会议时间地点** 2019 年 1 月 10 日，下院 211
- **会议日程**

时间	报告人	标题
10:30- 11:00	王 周 宁 馨	Homomorphisms of signed subdivisions of K4
		Lunch break
13:20 - 13:50	来米加	What's systole?
14:00 - 14:30	李吉有	The art of inclusion-exclusion sieving
		Coffee break
14:50 - 15:20	张跃辉	Is 1 always positive?
15:30 - 16:00	李友林	Spheres, holes and duality
		Brain Break
16:20-17:00	程帆	On the complete monotonicity of heat equation
17:10-18:00	邱宇	Cluster exchange groupoids and quadratic differentials
		18:30 Dinner

➢ 报告摘要

Speaker: 程帆

Title: On the complete monotonicity of heat equation

Abstract: A function f(t) is called complete monotone, if and only if all the signs of its derivatives are alternating in + and -; e.g., 1/t and e−t. The complete monotone index (CMI) is generalized to denote the length of the alternating sequence of + and -. By this means, both the CMI of 1/t and e−t are +∞. Gaussian complete monotonicity conjecture (GCMC): let f(x,t) be the solution to the heat equation on the line, then the entropy h(f(x,t)) is complete monotone in t. By means of information theory: Let X be an arbitrary random variable which is independent of the standard normal distribution (Gaussian distribution) Z∼N(0,1), then h(X+t√Z) is complete monotone in t. The conjecture was first studied by H. P. McKean in 1966. We rediscovered it in 2015. In this talk, we will introduce our conjecture and progress on the complete monotonicity conjecture on heat equation.

Speaker: 来米加

Title: What's systole?

Abstract: In this talk, I will give a brief introduction to the systolic geometry. After introducing the first two systolic inequalities: Loewner's on T^2 and Pu's on RP^2, I will present the far-reaching systolic inequality of Gromov, and discuss a new approach by Guth.

Speaker: 李吉有

Title: The art of inclusion-exclusion sieving

Abstract: The principle of inclusion-exclusion is one of the most important tools in combinatorics, number theory and probability theory. This exploratory talk will focus on its proofs, generalizations and applications in theoretical computer science and number theory. Brun's sieve and some classic problems in computational complexity will be explained in details.

Speaker: 李友林

Title: Spheres, holes and duality

Abstract: In this talk, we will explain a dual phenomenon between nonempty proper subsets of spheres and their complements.

Speaker: 邱宇

Title: Cluster exchange groupoids and quadratic differentials

Abstract: We introduce the cluster exchange groupoid associated to a non-degenerate quiver with potential, as an enhancement of the cluster exchange graph. In the case of the decorated marked surface S, the universal cover of this groupoid can be constructed using decorated triangulations of S. Such a covering graph is a skeleton for a space of suitably framed quadratic differentials on S, which in turn models the space Stab(S) of Bridgeland stability conditions for the 3-Calabi-Yau category associated to S. Finally, we show that Stab(S) is simply connected.

Speaker: 王周宁馨

Title: Homomorphisms of signed subdivisions of K4

Abstract: A homomorphism of a signed graph (G;Σ) to (H;Π) is a mapping from the vertices and edges of G, respectively, to the vertices and edges of H such that adjacencies, incidences, and signs of closed walks are preserved. The core of a signed graph (G;Σ) is the minimal subgraph (G;Σ′) of this signed graph, such that there exists a homomorphism of (G;Σ) to (G;Σ′). Motivated by studies on mapping sparse signed graphs into a given target, such as Jaeger-Zhang Conjecture or its bipartite analogue introduced by Charpentier, Naserasr and Sopena, we characterize those signed K4-subdivisions which are cores. We also characterize those graphs to which every signed K4-minor free graph admits a homomorphism.

Speaker: 张跃辉

Title: Is 1 always positive?

Abstract: Is the integer 1 always positive? Or easier, is the integer 1 always positive in the field of real numbers? No human can answer this “simple” problem over 2000 years. In 1926, E. Artin got the first correct solution to this problem. This talk is about this story and recent progress in this direction.