离散几何分析研讨会 Day 1

时间：2021 年 7 月 3 日（星期六）

上午 8:00-11:20，下午 1:00-4:20

地点：腾讯会议在线

主办单位：清华大学，中国科学技术大学，南京信息工程大学，复旦大学

主办人：林勇（清华大学）；刘世平（中国科学技术大学）；黄学平（南京信息工程大学）；华波波（复旦大学）

	7 月 3 日
上午 8:00-8:40	王林峰
8:50-9:30	王宇钊
9:50-10:30	刘双
10:40-11:20	刘永涛
下午 1:00-1:40	邵嗣烘
1:50-2:30	余成杰
2:50-3:30	任世全
3:40-4:20	何遵武

报告题目：p-curvature dimension condition on the graph

报告人：王林峰

报告人所在单位：南通大学

报告摘要：Let G (V,E) be a connected locally finite graph. In this report we firstly define two p-curvature dimension conditions on G, and study the relationship between them. Then we verify p-curvature dimension conditions on some special graphs, and show that the p-curvature dimension condition holds for any p>2. We also establish parabolic and elliptic gradient estimates for p-Laplace operator on graphs with some suitable p-curvature dimension condition, and establish the Liouville theorem and the eigenvalue estimate for the p-Laplace operator.

报告题目：Eigenvalue estimates and Harnack inequalities for p-Laplacian on finite graphs

报告人：王宇钊

报告人所在单位：山西大学

报告摘要：In this talk, we study the eigenvalue estimate and Harnack inequality of p-Laplacian on finite graphs. Under the generalized curvature dimension condition, we obtain a lower bound of the first eigenvalue of p-Laplacian. Moreover, by using of the linearized p-Laplacian, the Harnack inequality and logarithmic Harnack inequality are derived, which generalize the results of Chung-Yau.

报告题目：Functional inequalities and heat kernel upper bound on graph

报告人：刘双

报告人所在单位：中国人民大学

报告摘要：In this talk, I will present isoperimetric inequality on non-nonnegatively curved graphs. Moreover, I will discuss the equivalent between functional inequalities

and heat kernel upper bound on non-nonnegatively curved graphs. These functional inequalities include L1-Sobolev inequality, L2-Sobolev inequality, Nash inequality, Faber–Krahn inequality and log- Sobolev inequality. This talk is based on the joint work with Prof. Yong Lin and Hongye Song as well the recent work of mine.

报告题目：Hamilton inequality for unbounded Laplacians on graphs

报告人：刘永涛

报告人所在单位：首都师范大学

报告摘要：In this talk, we will discuss Hamilton inequality for unbounded Laplacians on weighted graphs satisfying CDE‘$(-K,\infty)$ for some $K \geqslant 0$. This is a generalization of Paul Horn’s result for bounded Laplacians.

报告题目：Lovász extension and graph cut

报告人：邵嗣烘

报告人所在单位：北京大学

报告摘要：The Lovász extension provides a both explicit and equivalent continuous optimization problem for a discrete optimization problem. In this talk, we report a set-pair Lovász extension which provides not only an answer to the dual Cheeger cut, anti-Cheeger cut, and max 3-cut problems, all of which cannot be handled by the Lovász extension, but also works for the Cheeger cut and maxcut problems. In particular, the set-pair Lovász extension enlarges the feasible region of resulting equivalent continuous optimization problems from a half space resulted from the original Lovász extension to the entire space. On the other hand, it also provides new possibilities for designing continuous optimization algorithms for combination

problems on the practical side. As an illustration, we propose a continuous iterative algorithm for the maxcut problem and the anti-Cheeger problem. Numerical experiments on G-set demonstrate that the approximated solutions produced by the proposed continuous iterative algorithm are of comparable quality to those obtained by advanced heuristic combinational algorithms. Our preliminary attempts reflect a deep connection between continuous math filed and discrete data world, and may provide a valuable reference for other combinatorial problems and fractional programming problems.

报告题目：Eigenvalue comparisons and Lichnerowicz estimates on graphs

报告人：余成杰

报告人所在单位：汕头大学

报告摘要：In this talk, we will present some comparisons of the Steklov eigenvalues, Dirichlet eigenvalues, Neumann eigenvalues and the Laplacian eigenvalues on graphs. As applications of the comparisons of eigenvalues, some Lichnerowicz-type estimates on Steklov eigenvalues, Dirichlet eigenvalues, Neumann eigenvalues on graphs will be also presented.

报告题目：Weighted Analytic Torsions for Weighted Digraphs

报告人：任世全

报告人所在单位：河南大学

报告摘要：In this talk, we consider vertex-weighted digraphs with weights (f,g) for non-vanishing real functions f and g on the set of vertices. We study the weighted analytic torsions. We calculate the (f,g)-weighted analytic torsions by

examples and prove that the (f,g)-weighted analytic torsions only depend on the ratio f/g. In particular, if the weight is of the diagonal form (f,f), then the weighted analytic torsion equals to the usual (un-weighted) analytic torsion. This is a joint work with Ms. Chong Wang, under the guidance of Prof. Yong Lin.

报告题目：The Steklov flow and its applications

报告人：何遵武

报告人所在单位：复旦大学

报告摘要：In this talk, we focus on the first Steklov eigenvalue of finite trees. By introducing appropriate Steklov flows on trees, we prove the monotonicity of the first nonzero Steklov eigenvalues on trees: for finite trees $\g_1$ and $\g_2,$ the first nonzero Steklov eigenvalue of $\g_1$ is greater than or equal to that of $\g_2$, provided that $\g_1$ is a subgraph of $\g_2.$ Some rigidity results are given as applications, if time permits. This is a joint work with Bobo Hua.