

## **Fully nonlinear elliptic equations for conformal deformation of Chern-Ricci curvatures**

Bo Guan          Ohio State University

**Abstract.** There are several ways to define Chern-Ricci curvatures for the Chern connection on a non-Kähler Hermitian manifold. We introduce a notion of mixed-Chern-Ricci forms, which naturally occur in geometric problems and seem interesting to study, and consider fully nonlinear elliptic equations for their conformal deformation.

In this talk we report our work on a class of more general equations, including a priori estimates and existence results under very general structure conditions. Our work is motivated by the close connections of these equations to problems in non-Kähler complex geometry, and the fact that there have been increasing interests in fully nonlinear pde's beyond the complex Monge-Ampère equation from complex geometry.

If time permits, we shall discuss results on the Dirichlet and Neumann problems for the fully nonlinear equations on real manifolds. We try to understand roles of subsolutions and concavity condition in establishing estimates for second derivatives, and clarify relations between different notions of generalized subsolutions introduced by myself and Székelyhidi.

## **Asymptotic Expansions of Solutions of the Yamabe Equation and the $\sigma_k$ Yamabe Equation near Isolated Singular Points**

Qing Han          University of Notre Dame

**Abstract.** We study asymptotic behaviors of positive solutions to the Yamabe equation and the  $\sigma_k$  Yamabe equation near isolated singular points and establish expansions up to arbitrary orders. Such results generalize an earlier pioneering work by Caffarelli, Gidas, and Spruck, and a work by Korevaar, Mazzeo, Pacard, and Schoen, on the Yamabe equation, and a work by Han, Li, and Teixeira on the  $\sigma_k$  Yamabe equation. The proof is based on a study of the linearized operators at radial solutions, following an approach adopted by Korevaar et al.

## Geometric flows to Minkowski problems

Yong Huang      Hunan University

**Abstract.** In this talk, we recall how to solve Minkowski problems by using geometric flows, such as Gauss curvature flow. In particular, a recent joint work, the regularity of  $L_p$  dual Minkowski problem with Chuanqiang Chen, Yiming Zhao will be particularly discussed.

## P-Minkowski Problem

Huaiyu Jian      Tsinghua University

**Abstract.** This talk is based on the joint works with Jian Lu and Xu-Jia Wang. Recalling the Problem and its backgrounds, we report a few results including existence, uniqueness and non-uniqueness under the critical case ( $p > n-1$ ). Then we talk about a few special results on the existence in the critical case ( $p = n-1$ ), although a general existence result has not been obtained.

## 非线性抛物方程的 Neumann 边值问题

Xinan Ma      University of Science and Technology of China

**摘要.** 我们研究凸区域上的常平均曲率方程的 Neumann 问题与预定夹角问题, 考虑对应平均曲率流的平移解问题。我们也研究凸区域上的抛物  $k$ -Hessian 方程以及相应的平移解。它是与王培合, 陈传强、张德凯等合作。

## Quantitative Maximal Volume Entropy Rigidity

Xiaochun Rong      Rutgers University

**Abstract.** The maximal volume entropy rigidity of Ledrappier-Wang asserts that a compact  $n$ -manifold with Ricci curvature bounded below by  $-(n-1)$  achieves the maximal volume entropy if and only if the manifold is hyperbolic. In this talk, we will report a recent work that if a manifold almost achieves the maximal volume entropy, then the manifold is diffeomorphic to a hyperbolic space.

## **Locally convex surfaces and related topics**

Xu-Jia Wang      The Australian National University

**Abstract.** In this talk we will develop some properties of locally convex surfaces, such as the uniform cone condition, and use them to study related problems, such as the existence of locally convex surfaces with constant Gauss curvature and the Euclidean completeness of locally convex surfaces. In particular we will consider the four vertex theorem for space curves. The classical four vertex theorem states that a planar Jordan curve contains at least four vertices. We show that a closed space curve contains four torsion zero points if it spans a locally convex surface which is a topological disc.

## **Einstein scalar field Lichnerowicz equations**

Xingwang Xu      Nanjing University

**Abstract.** I will discuss the existence and multiplicity results of Einstein scalar fields L-equations under certain necessity conditions. The talk is based on joint work with Dr. NGO Quoc Anh.

## **Differential geometry of holomorphic vector bundles**

Xi Zhang      University of Science and Technology of China

**Abstract.** In this talk, we first recall some classical results on the differential geometry of holomorphic vector bundles, and introduce our recent work on the existence of canonical metrics, Bogomolov type inequalities and the Hermitian Yang-Mills flow. These works are joint with Jiayu Li, Yanci Nie, Chuanjing Zhang and Pan Zhang.

## **Relative volume comparison of Ricci flow**

Zhenlei Zhang      Capital Normal University

**Abstract.** In this talk we present a relative volume comparison of Ricci flow. It is a refinement of Perelman volume non-collapsing estimate of Ricci flow and can be applied to Ricci flow with a collapsing structure at infinity time. It is a joint work with professor Tian.