GEOMETRIC QUANTIZATION ON CR MANIFOLDS

XIAONAN MA

Let X be a compact connected orientable Cauchy-Riemann (CR) manifold with the action of a compact Lie group G. Then we can define a notion so-called "CR reduction". We try to understand the relation on G-invariant CR functions on the original CR manifold and the CR functions on its CR reduction. Under natural pseudoconvexity assumptions we show that the natural map induced by restriction is Fredholm at the level of Sobolev spaces of CR functions. As application we study this map for holomorphic line bundles which are positive near the inverse image of 0 by the momentum map. We also show that "quantization commutes with reduction" for Sasakian manifolds. This is a joint work with Chin-Yu Hsiao and George Marinescu

Université de Paris, Paris, France

RICCI-FLAT METRICS AND THE BOUNDARY OF THE KÄHLER CONE

VALENTINO TOSATTI

I will discuss the problem of understanding the behavior of Ricci-flat Kähler metrics on Calabi-Yau manifolds when their cohomology class degenerates to the boundary of the Kähler cone. We have a good understanding of what happens when the limiting class has positive volume, or has zero volume and comes from the base of a holomorphic fibration. I will also discuss some results and conjectures in the remaining case, when the volume goes to zero but there is no fibration structure.

McGill University, Montréal, Canada

THE SUBSOLUTION THEOREMS FOR WEAK SOLUTIONS OF THE COMPLEX MONGE-AMPÈRE EQUATIONS

NGOC CUONG NGUYEN

In 1995 Kołodziej proved the existence of the bounded plurisubharmonic solution to the complex Monge-Ampère equation on a bounded strictly pseudoconvex domain provided that the measure on the right hand side admitted a bounded subsolution. It is often called the bounded subsolution theorem. We will discuss recent results which extend this theorem to complex manifolds with or without boundary. This is based on joint work with S. Kołodziej.

KAIST, Daejeon, Korea

NON-ARCHIMEDEAN PLURIPOTENTIAL THEORY: A SURVEY

SEBASTIEN BOUCKSOM

The non-Archimedean version of pluripotential theory takes place on analytic spaces in the sense of Berkovich, which are basically spaces of valuations, and studies psh functions and Monge-Ampère equations thereon. The case of a trivially valued ground field is of special interest, due to its close relationship to K-stability, and can be viewed as a far-reaching generalization of the study of real Monge-Ampère equations for convex functions (which correspond to the toric case). The purpose of this talk is to survey some aspects of this theory, and their implications in the study of K-stability.

École Polytechnique, Paris, France

UNIFORM ESTIMATES FOR COMPLEX MONGE-AMPÈRE AND FULLY NONLINEAR EQUATIONS

BIN GUO

Uniform estimates for complex Monge-Ampère equations have been extensively studied, ever since Yau's resolution of the Calabi conjecture. Subsequent developments have led to many geometric applications to many other fields, but all relied on the pluripotential theory from complex analysis. In this talk, we will discuss a new PDE-based method of obtaining sharp uniform C^0 estimates for complex Monge-Ampère (MA) and other fully nonlinear PDEs, without the pluripotential theory. This new method extends more generally to other interesting geometric estimates for MA and Hessian equations. This is based on the joint works with D.H. Phong, F. Tong.

Rutgers University, Newark, USA

TO THE GEOMETRY OF SPACES OF PLURISUBHARMONIC FUNCTIONS ON KÄHLER MANIFOLDS

LASZLO LEMPERT

On a compact Kähler manifold (X, ω) we consider the space E of ω–plurisubharmonic functions and introduce a quantity $\rho[u, v]$ intended to measure the distance of functions $u, v \in E$. This is not a number, but a function on a certain real interval, from which metrics introduced by Mabuchi and Darvas can be recovered. The point of the talk is to describe various properties of $\rho[u, v]$.

Purdue University, West Lafayette, USA

MONGE-AMPÈRE VOLUMES ON COMPACT COMPLEX MANIFOLDS

HOANG-CHINH LU

We study Monge-Ampère volumes on compact Hermitian non-Kähler manifolds. We prove that having Monge-Ampère volume bounded away from zero (or infinity) is a bimeromorphic invariant. Our approach relies on a fine use of quasi-plurisubharmonic envelopes. Using this we partially answer a conjecture de Demailly-Paun. This is a joint work with Vincent Guedj.

Université Paris-Saclay, Orsay, France

THE MABUCHI GEOMETRY OF LOW ENERGY CLASSES

TAMÁS DARVAS

Let (X, ω) be a Kähler manifold and $\psi : \mathbb{R} \to \mathbb{R}_+$ be a concave weight. We show that the space of smooth Kähler potentials admits a natural metric d_ψ whose completion is the low energy space $\mathcal{E}_\psi$, introduced by Guedj-Zeriahi. As d_ψ is not induced by a Finsler metric, the main difficulty is to show that the triangle inequality holds.

University of Maryland, College Park, USA

LINES ON HOLOMORPHIC CONTACT MANIFOLDS AND A GENERALIZATION OF (2,3,5)-DISTRIBUTIONS TO HIGHER DIMENSIONS

JUN MUK HWANG

Since the celebrated work by E. Cartan, distributions with small growth vector (2,3,5) have been studied extensively. In the holomorphic setting, a natural correspondence between holomorphic (2,3,5)-distributions and nondegenerate lines on holomorphic contact manifolds of dimension 5 has been discovered in a joint-work with Qifeng Li. Furthermore, this correspondence can be extended to higher dimensions by studying nondegenerate lines on holomorphic contact manifolds and the corresponding class of distributions of small growth vector (2m, 3m, 3m+2) for any positive integer m

IBS Center for Complex Geometry, Daejeon, Korea

THE CHERN-RICCI FLOW

BEN WEINKOVE

I will give a survey on the Chern-Ricci flow, a parabolic flow of Hermitian metrics on complex manifolds. I will emphasize open problems and new directions.

Northwestern University, Evanston, USA

GEODESIC DISTANCE

ELEONORA DI NEZZA

In relation with the problem of looking for canonical metrics on a compact Kḧler manifold, the geometry of the space of Kḧler potentials has been intensively studied in the last 20 years. The latter space can be endowed of a family of Finsler metrics d_p. As shown by Darvas, the (d_p) distance between two potentials with bounded Laplacian can be expressed with a very nice formula. In a joint paper with Chinh Lu we prove that this formula still holds for more singular potentials having only finite entropy.

École Polytechnique, Paris, France

COMPLETE CALABI-YAU METRICS ON THE COMPLEMENT OF TWO DIVISORS

TRISTAN COLLINS

In 1990 Tian-Yau proved that if Y is a Fano manifold and D is a smooth anti-canonical divisor, the complement $X = Y \setminus D$ admits a complete Calabi-Yau metric. A long standing problem has been to understand the existence of Calabi-Yau metrics when D is singular. I will discuss the resolution of this problem when $D = D_1 + D_2$ has two components and simple normal crossings. I will also explain a general picture which suggests the case of general SNC divisors should be inductive on the number of components. This is joint work with Y. Li.

MIT, Cambridge, USA

EXISTENCE THEOREMS ON COMPLEX MANIFOLDS WHICH ARE COMPLETE KÄHLER AT INFINITY

TAKEO OHSAWA

A complex manifold is said to be complete Kähler at infinity if it admits a complete metric whose fundamental form is closed outside a compact subset. A large amount of locally pseudoconvex domains have this property. It is expected that basic existence theorems on strongly pseudoconvex manifolds have natural generalizations on such manifolds. Affirmative results in this direction will be shown.

Nagoya University, Nagoya, Japan

PLURISIGNED HERMITIAN METRICS

VINCENT GUEDJ

Let (X, ω) be a compact hermitian manifold. We study the asymptotic behavior of Monge-Ampère volumes of hermitian forms that are dd^c-cohomologous to ω. We show that these are uniformly bounded if ω satisfies some pluripositivity condition, and that they are uniformly positive if ω is plurinegative in dimension 3. We study the existence of such plurisigned hermitian metrics on various classes of examples. This is Joint work with D.Angella and H.C.Lu.

Université Paul Sabatier, Toulouse, France

HERMITE-EINSTEIN METRICS IN SINGULAR SETTING AND APPLICATIONS

MIHAI PAUN

We will present a joint work in progress concerning the existence and the properties of Hermite-Einstein metrics on stable reflexive sheaves. Part of our results can be seen as generalization of a theorem due to Bando-Siu.

University of Bayreuth, Bayreuth, Germany