



Im Rahmen der

AG Komplexe Analysis

laden wir zu folgender Vortragsreihe ein:

Real and complex Brunn-Minkowski theory

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Die Vorträge finden statt in der Zeit **08.01.2024 bis 24.01.2024** in den Räumen G.10.05 (Hörsaal 07) und G.15.25 der Bergischen Universität Wuppertal.

Part I: Domains in Euclidean space.

Lecture 1 & 2 (Monday, 08.01., 16:00 s.t. - 18:00, G.10.05)

1. The theorems of Brunn-Minkowski and Prékopa.
We state and prove the Brunn-Minkowski theorem on volumes of convex bodies, as well as its generalization to convex functions by Prékopa. We follow the approach by Brascamp and Lieb.
2. The space of convex functions as an infinite dimensional Riemannian manifold.
We introduce two structures on the space of convex functions and show they are isomorphic under the Legendre transform.

Lecture 3 & 4 (Wednesday, 10.01., 14:00 s.t. - 16:00, G.15.25)

3. Beginning of complex Brunn-Minkowski theory.
Setup of the problem in the case of domains in \mathbb{C}^n . Kiselman's counterexample.
4. The Bergman kernel.
Definition of the Bergman kernel. Hörmander's L^2 -estimates for the $\bar{\partial}$ -operator. Comparison with the Brascamp-Lieb inequality.

Lecture 5 & 6 (Monday, 15.01., 16:00 s.t. - 18:00, G.10.05)

5. Asymptotic expansion of the Bergman kernel.
The simplest cases of the results by Bouche-Catlin-Tian and Zelditch on the Bergman kernels for different weights.

6. Plurisubharmonic variation of Bergman kernels.
The dependence of the Bergman kernel under variations of the weight. Comparison with Prékopa's theorem.

Part II: Complex manifolds.

Lecture 7 & 8 (Wednesday, 17.01., 14:00 s.t. - 16:00, G.15.25)

7. Line bundles and vector bundles.
Basic definitions. Chern connection and curvature.
8. Positivity of direct images.
Vector bundles associated to a holomorphic fibration. L^2 -metrics and positivity properties of their curvature.

Lecture 9 & 10 (Monday, 22.01., 16:00 s.t. - 18:00, G.10.05)

9. The space of Kähler metrics in a given cohomology class.
Mabuchi's metric and geodesics. Comparison with the space of convex functions.
10. Donaldson's quantization picture.
The L^2 -metric and the Bergman kernel as a tool to study canonical metrics. Comparison with the Legendre transform.

Lecture 11 & 12 (Wednesday, 24.01., 14:00 s.t. - 16:00, G.15.25)

11. Fano manifolds.
Kähler-Einstein metrics as critical points of a convex functional. The Bando-Mabuchi uniqueness theorem.
12. Other applications.
To be decided.

Alle Interessenten sind herzlich eingeladen!

gez. Prof. N. Shcherbina