

東北大学大学院情報科学研究科
純粋・応用数学研究センター

第33回 幾何と解析セミナーのお知らせ

日 時： 2024年2月9日(金) 15:00 — 16:00
場 所： 東北大学大学院情報科学研究科棟 6階小講義室
講演者： 古谷 賢朗 氏 (大阪公立大学数学研究所)
題 目： Calabi-Yau structure and Bargmann type transformation
on the Cayley projective plane

[概要] The purposes of this talk are

(1) to show an explicit expression of invariant Kähler structure and its Calabi-Yau structure on the punctured cotangent bundle $T_0^*(P^2\mathbb{O})$ of the Cayley projective plane $P^2\mathbb{O}$. Then based on this expression

(2) to construct a *Bargmann type transformation* between the spaces of holomorphic functions on $T_0^*(P^2\mathbb{O})$, which we call a Fock (like) space following the classical case, and the L_2 -space on $P^2\mathbb{O}$.

A Kähler structure on $T_0^*(P^2\mathbb{O})$ is shown by identifying it with a quadrics in the complex space $\mathbb{C}^{27}\setminus\{0\}$ and the natural symplectic form of the cotangent bundle $T_0^*(P^2\mathbb{O})$ is expressed as a Kähler form.

The space of holomorphic functions on $T_0^*(P^2\mathbb{O})$ corresponds to the Fock space in the case of the original Bargmann transformation.

Our method to construct the transformation is the pairing of polarizations, one is the natural Lagrangian foliation given by the projection map $\mathbf{q} : T_0^*(P^2\mathbb{O}) \rightarrow P^2\mathbb{O}$ and the positive complex polarization defined by the Kähler structure.

The transformation gives a quantization of the geodesic flow in terms of one parameter group of elliptic Fourier integral operators whose canonical relations are defined by the graphs of the geodesic flow action at each time.

In the talk I start to explain a realization of various (classical) projective spaces in the matrix spaces, which is very elementary and is useful to understand the exceptional projective space, the *Cayley projective plane*. They suggest the map to define a Kähler structure on $T_0^*(P^2\mathbb{O})$. Avoiding the details I will emphasis on geometric structures for defining such transformation.

幾何と解析セミナー世話人：坂口茂, 船野敬, 高橋淳也

ホームページ： <http://www.math.is.tohoku.ac.jp/gaseminar/index.html>