NCTS
National Center for Theoretical Sciences

Taiwan Mathematics School
2025 Spring
新學期學分課程上線預告！！

From Differential Geometry to tt* Geometry-(2)
從微分幾何到tt*幾何–下

Time 2025.2.20~6.12 Every Thursday, 10:20-12:10 Venue Room 509, Cosmology Building, NTU

Speaker | **Martin Guest** Waseda University **Organizer** | **Nan-Kuo Ho** National Tsing Hua University

Course Background & Purposes

(I) MOTIVATION
- **the idea of homology and cohomology** (cycles in a manifold)
- **the idea of quantum cohomology** (cycles in a space of mappings)
- **Examples of quantum differential equations** (commutativity versus noncommutativity)

(II) DIFFERENTIAL EQUATIONS AND DIFFERENTIAL GEOMETRY
- **o.d.e. in the complex plane or Riemann sphere** (canonical solutions from the Frobenius Method)
- **the Stokes Phenomenon** (canonical solutions in sectors)
- **flat connections, parallel translation** (multivalued flat sections)
- **the fundamental group and monodromy**
- **the idea of integrable systems** (zero curvature equations)
- **the Painleve property and isomonodromy equations**
- **the harmonic map equation** (harmonic maps into symmetric spaces)

(III) ADVANCED TOPICS
- **the DPW method** (loop group method)
- **the idea of the naHC** (nonabelian Hodge Correspondence)
- **the idea of topological-antitopological fusion** (conformal field theory)
- **examples of the tt* equations** (tt*-Toda equations)
- **Stokes data of the tt*-Toda equations** (towards algebraic and categorical ideas)

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Credit 2
Course Number/ ID
No.: NCTS 5005
（三校聯盟之學生於課程網選課適用）
ID: V41 U3012

More information

Geometry, Algebra, and Topology with a view towards application and computation
幾何、代數與拓撲學：應用與計算視角

Time 2025.2.24~3.17 Every Monday, 15:30-17:20 Venue Room 505, Cosmology Building, NTU

Speaker | **Christopher Peterson** Colorado State University **Organizer** | **Jungkai Chen** National Taiwan University

Course Background & Purposes

Prof. Chris Peterson was trained as an algebraic geometer (on liaison theory) and then famous for his work in computational algebraic geometry. His recent work on geometric data analysis is also very interesting. We plan to invite him to visit NCTS during the period Feb. 15-Mar. 31, 2025.
He has very broad interests. His work ranging from computation of Hilbert series, which is very purely algebraic geometry oriented, to the analysis of maps between data set by using concept in algebraic geometry. He also collaborates with scientists and physicians on geometric data analysis and many other topics.
During his stay, we plan to organize a mini-course of 8 hours (counted as 0.5 credit), which consists of:
0. Preschool (training of TAs)

2/24 Course I (for two hours)
Topic on computational algebraic geometry 1

3/3 Course II (for two hours)
Topic on computational algebraic geometry 2 with hand-on workshop

3/10 Course III
which is a hands-on workshop at Chung-Cheng University at Chia-Yi
Topic on computational algebraic geometry 3

3/17 Course IV (for two hours)
Topic on computational algebraic geometry 4 with hand-on workshop

Credit 5
Course Number/ ID
No.: NCTS 5006
（三校聯盟之學生於課程網選課適用）
ID: V41 U2050

More information