About

Unveiling Ceremony of the Harbin Base of the Sino-Russian Mathematics Center

Harbin-Saint Petersburg Mathematics Forum

The Harbin-Saint Petersburg Mathematics Forum will be held at the Sino-Russian Joint Campus of Harbin Institute of Technology from October 28 to 31, 2026, hosted by the Institute for Advanced Study in Mathematics at Harbin Institute of Technology. Arrival and registration will take place on October 28, and departure on October 31.

Venue

Sino-Russian Joint Campus, Harbin Institute of Technology

Contact

Xiao Xiong `xxiong@hit.edu.cn`
Mo Yan `yanmo@hit.edu.cn`

Timetable

Wednesday, October 28

Check-in: Orange Hotel (Harbin Institute of Technology Harbin Railway Station)

Thursday, October 29

09:15–09:30	**Registration**	
09:30–10:30	**Opening Ceremony and Unveiling Ceremony**	
10:50–11:30	**Maxim Vsemirnov** St. Petersburg Department of Steklov Mathematical Institute, Russian Academy of Sciences	Hurwitz and $(2, 3)$-generated groups: a survey
14:30–15:10	**Sergei Kislyakov** St. Petersburg Department of Steklov Mathematical Institute, Russian Academy of Sciences	Isomorphism problems, averaging, and dominance for differential operators
15:20–16:00	**Jinghao Huang** Harbin Institute of Technology	Isometric embeddings of noncommutative L_p-spaces into noncommutative symmetric spaces
16:30–17:10	**Olga Postnova** Euler International Mathematical Institute, St. Petersburg Department of Steklov Mathematical Institute, Russian Academy of Sciences	Asymptotical behaviour of Kronecker coefficients for S_N when $N \to \infty$

Friday, October 30

09:00–09:40	**Bakhrom Omirov** Harbin Institute of Technology	Cohomological Rigidity of Solvable Lie Algebras of Maximal Rank
10:10–10:50	**Andrei Maliutin** St. Petersburg Department of Steklov Mathematical Institute, Russian Academy of Sciences	Generalizations of the Borsuk–Ulam, Hopf, and Lusternik–Schnirelmann Theorems
11:00–11:40	**Ning Guo** Harbin Institute of Technology	Purity theorems over valuation rings
14:30–15:10	**Alexei Kushner** Moscow State University	On a question of Sophus Lie: when can Monge-Ampère equations be linearized by contact transformations?
15:20–16:00	**Vladimir Al. Osipov** Harbin Institute of Technology	Dual-unitary quantum lattice models
16:30–17:10	**Utkir Rozikov** Harbin Institute of Technology	Gibbs measures in Machine Learning

Saturday, October 31

Departure

Abstracts

Thursday, October 29

Hurwitz and $(2, 3)$-generated groups: a survey

Maxim Vsemirnov 10:50–11:30

St. Petersburg Department of Steklov Mathematical Institute, Russian Academy of Sciences

A group is called $(2, 3)$-generated if it can be generated by an involution and an element of order 3. The class of $(2, 3)$-generated groups is of great interest because of its relation to the quotients of the modular group $PSL(2, Z)$. Hurwitz groups form an important subclass of $(2, 3)$-generated groups. In my talk I shall discuss the history of the problem as well as recent progress.

Isomorphism problems, averaging, and dominance for differential operators

Sergei Kislyakov 14:30–15:10

St. Petersburg Department of Steklov Mathematical Institute, Russian Academy of Sciences

It will be shown how the averaging method can significantly simplify the proofs of several well-known results on the isomorphic classification of spaces of smooth functions and establish new ones. The relationship between this range of problems and old results on domination for differential expressions will be clarified.

Isometric embeddings of noncommutative L_p-spaces into noncommutative symmetric spaces

Jinghao Huang 15:20–16:00

Harbin Institute of Technology

We establish a noncommutative version of a familiar Johnson–Maurey–Schechtman–Tzafriri Theorem, by showing that for any $0 < p < 2$ and a (not necessarily semifinite) von Neumann algebra $\mathcal{M}$ on a separable Hilbert space, if a symmetric quasi-Banach function space $E(0, 1)$ contains the function $t \mapsto t^{-1/p}$, $0 < t \leq 1$, then there exists a noncommutative probability space $(\mathcal{N}, \sigma)$ such that $L_p(\mathcal{M})$ is isometric to a subspace of $E(\mathcal{N}, \sigma)$. In particular, this answers two questions raised by Randrianantoanina in 2006.

Asymptotical behaviour of Kronecker coefficients for S_N when $N \to \infty$

Olga Postnova 16:30–17:10

Euler International Mathematical Institute, St. Petersburg Department of Steklov Mathematical Institute, Russian Academy of Sciences

Using Schur–Weyl duality and the Weyl character formula we compute the asymptotical behaviour of tensor product multiplicities for representations of the symmetric group S_N as $N \to \infty$.

Friday, October 30

Cohomological Rigidity of Solvable Lie Algebras of Maximal Rank

Bakhrom Omirov 09:00–09:40

Harbin Institute of Technology

This talk is devoted to the adjoint cohomology of finite-dimensional complex solvable Lie algebras arising as maximal solvable extensions of nilpotent Lie algebras of maximal rank. For nilradicals with one-dimensional weight spaces, we establish sufficient conditions for the vanishing of the second adjoint cohomology group, extending the classical criterion of Leger and Luks. Our approach combines Hochschild–Serre factorization with an analysis of torus-invariant cocycles. Applications include maximal solvable extensions of model nilpotent Lie algebras and further cohomological rigidity criteria for rank-two nilradicals. We also prove that vanishing of adjoint cohomology in a finite range determined by the nilindex implies vanishing in every degree. Finally, we identify explicit weight configurations involving the center of the nilradical that ensure nontrivial second cohomology and yield lower bounds for its dimension.

Generalizations of the Borsuk–Ulam, Hopf, and Lusternik–Schnirelmann Theorems

Andrei Maliutin 10:10–10:50

St. Petersburg Department of Steklov Mathematical Institute, Russian Academy of Sciences

The Borsuk–Ulam theorem states that every continuous map from the n-dimensional sphere to n-dimensional Euclidean space maps some pair of antipodal points to the same point. This theorem belongs to a family of interrelated results that includes, among others, the Hopf and Lusternik–Schnirelmann theorems and the Tucker and Sperner lemmas. Some of these results admit generalizations related to the mountain-climbing lemma. The lecture will present these generalizations. (Joint work with Ilya Shirokov and Alisa Volkova.)

Purity theorems over valuation rings

Ning Guo 11:00–11:40

Harbin Institute of Technology

This talk presents recent results on purity theorems over valuation rings. We begin by investigating the Hartogs extension phenomenon for smooth algebras over valuation rings. We then discuss Zariski–Nagata purity, focusing on finite étale covers.

To support these geometric results, we review how the homological characterization of normal coherent rings, such as Serre's (R_1) and (S_2) conditions, can be formulated using homological invariants like depth and weak dimension in the coherent, non-Noetherian setting.

Finally, we analyze cohomological purity, specifically establishing the purity of Brauer groups for syntomic algebras over valuation rings by using perfectoid techniques of Cesnavicius–Scholze.

On a question of Sophus Lie: when can Monge-Ampère equations be linearized by contact transformations?

Alexei Kushner 14:30–15:10

Moscow State University

This talk focuses on a problem posed by Sophus Lie concerning second-order nonlinear partial differential equations—specifically, equations of the Monge-Ampère type. One of the theorems he formulated, though he did not provide a proof, states that the class of Monge-Ampère equations is closed under contact transformations. This theorem was proven 100 years later by Valentin Lychagin and Vladimir Rubtsov.

Sophus Lie posed the following problem: to determine the conditions under which equations of the Monge-Ampère type can be reduced to linear equations. For non-degenerate equations, I solved this problem several years ago. I will demonstrate that the task reduces to the construction of two differential 2-forms on the space of 1-jets. In the case of linear hyperbolic equations, these forms are generated by Laplace's relative invariants—specifically, the functions h and k. These functions are employed in the cascade integration of linear equations; consequently, I have termed the constructed differential 2-forms "Laplace forms." Unlike the aforementioned functions, these forms are absolute invariants of Monge-Ampère equations under contact transformations. In particular, if both forms are identically zero, then the Monge-Ampère equation is contact-equivalent to the wave equation.

Dual-unitary quantum lattice models

Vladimir Al. Osipov 15:20–16:00

Harbin Institute of Technology

Many-body quantum systems are challenging to study because their Hilbert spaces grow exponentially with system size. Substantial progress has been achieved through discrete-time many-body models, which give rise to stroboscopic Floquet dynamics. A remarkable class of exactly solvable lattice models is provided by dual-unitary quantum systems, which possess a complete space-time duality — the property of being unitary with respect to both temporal and spatial evolution. Recently, dual-unitary kicked Ising chain dynamics have been realized on a quantum computing platform and quantitatively compared with exact theoretical results. We discuss the basic kicked Ising chain model and the number of its exactly solvable extensions, and also their implementations on quantum computers.

Gibbs measures in Machine Learning

Utkir Rozikov 16:30–17:10

Harbin Institute of Technology

Machine learning often involves large, complex systems that require us to model uncertainty and draw inferences from data. Gibbs measures provide a mathematical framework for probabilistic modeling in such settings. In this talk, I will introduce Gibbs measures, explain their origins in statistical physics, and discuss their role in modern machine learning methods.