



Pacific Institute *for the* Mathematical Sciences

PIMS MONTHLY CONNECTION | **December 2020**



Hello from PIMS

As 2020 comes to a close, we have some exciting updates to share with the PIMS community.

The final report for the inaugural 2020 Math[^]Industry workshop, is now available. Additionally, the PIMS Education Call for Proposals is now open. Submissions are due January 19. More details on both of these exciting initiatives can be found in the News and Highlights section.

This month we have curated 2 blog posts to highlight the important role mathematics plays in problem solving. Check out the Media section to learn more.

We wish the PIMS community health and happiness for the New Year.

Sincerely,
The PIMS Team

FEATURE EVENTS



[PIMS - SFU Distinguished Lecture](#)
December 4: Hosted Virtually by PIMS

measuring the impact of scientific articles is important for evaluating the research output of individual scientists, academic institutions, and journals. While citations are raw data for constructing impact measures, there exist biases and potential issues if factors affecting citation patterns are not properly accounted for. In this work, we address the problem of field variation and introduce an article-level metric useful for evaluating individual articles' visibility. This measure derives from joint probabilistic modeling of the content in the articles and the citations among them using latent Dirichlet allocation (LDA) and the mixed membership stochastic blockmodel (MMSB). Our proposed model provides a visibility metric for individual articles adjusted for field variation in citation rates, a structural understanding of citation behavior in different fields, and article recommendations that take into account article visibility and citation patterns.



[The quanTA CRG Seminar](#)

December 9: Hosted Virtually by the University of Saskatchewan Anton Kapustin: The topology and geometry of the space of gapped lattice systems

Recently there has been a lot of progress in classifying phases of gapped quantum many-body systems. From the mathematical viewpoint, a phase of a quantum system is a connected component of the “space” of gapped quantum systems, and it is natural to study the topology of this space. I will explain how to probe it using generalizations of the Berry curvature. I will focus on the case of lattice systems where all constructions can be made rigorous. Coarse geometry plays an important role in these constructions.



[Emergent Research: The PIMS Postdoctoral Fellow Seminar](#)

December 16: Hosted Virtually by PIMS Shirou Wang: A coupling approach in the computation of geometric ergodicity for stochastic dynamics

This talk introduces a probabilistic approach to numerically compute geometric convergence rates in discrete or continuous stochastic systems. Choosing appropriate coupling mechanisms and combining them together, works well in many settings, especially in high-dimensions. Using this approach, it is observed that the rate of geometric ergodicity of a randomly perturbed system can, to some extent, reveal the degree of chaoticity of the unperturbed system. Potential applications of the coupling method and the visualization of higher dimensional non-convex functions, e.g., the loss functions of neural networks, will be discussed.

Scientific

NEWS & ANNOUNCEMENTS



Math^{Industry} Workshop: Final Report and Results are now Available!

During the month of August, PIMS and partners launched the inaugural workshop of [Math^{Industry}](#). The workshop was a rapid response program, designed to mitigate the economic impact of the COVID-19 pandemic. 10 teams of mathematicians worked with academic and industry mentors to solve industry problems using modelling, computation, statistics, optimization, as well as other areas within the mathematical sciences. We are pleased to announce the [final report](#) is now available, and demonstrates how mathematics and statistics can be used to find solutions to problems that had otherwise been evaded.

PIMS Education Call For Proposals

The Pacific Institute for the Mathematical Sciences (PIMS) welcomes applications for support of education activities in the mathematical sciences to occur after April 1, 2021. The deadline for submission is **January 19, 2021**. We will be awarding grants from \$500 up to \$5000. We welcome proposals aimed at creating opportunities for students to learn (Math Fairs, Math Mania, Summer Camps, Problem Solving Workshops, Hackathons), for teachers to improve their knowledge of mathematics, statistics and computer science, and their capacity to teach (Teacher training workshops). PIMS welcomes proposals that address historical challenges faced by First Nations, Inuit, and Métis and encourage submissions with new ideas! More details can be found [here](#).

MEDIA



Interview with PIMS Postdoctoral Fellow: Shirou Wang



COVID-19 and Mathematics: Who Knew it Could be so Flexible?

PIMS COMMUNITY RECENT PUBLICATIONS

1. Karpenko, N., & Mackall, E. (2019). [On the K-theory coniveau epimorphism for products of Severi–Brauer varieties](#). *Annals of K-theory*, 4(2), 317-344.
2. Liu, B., & Zhang, Q. (2019). [Uniqueness of certain Fourier-Jacobi models over finite fields](#). *Finite Fields and Their Applications*, 58, 70-123.
3. Pirisi, R., & Talpo, M. (2019). [On the Motivic Class of the Classifying Stack of and the Spin Groups](#). *International Mathematics Research Notices*, 2019(10), 3265-3298.

ABOUT PIMS

[Subscribe](#)

[Past Issues](#)

The Pacific Institute for the Mathematical Sciences (PIMS) was created in 1996 to promote discovery, understanding and awareness in the mathematical sciences. PIMS

has expanded from the mathematics community of **Alberta** and **British Columbia** to include **Washington State**, **Saskatchewan** and **Manitoba**. We are proponents of mathematical **collaboration with industry**, **innovation in mathematics education** from K-12 to graduate level initiatives, **public outreach** and **partnerships** with similar organizations around the globe. We fund Collaborative Research Groups, Post-Doctoral Fellowships, individual events, and competitive prizes in mathematics.

FOLLOW US!



Mailing address:

Pacific Institute for the Mathematical Sciences

The University of British Columbia

4176-2207 Main Mall

Vancouver, BC V6T 1Z4

Canada

[unsubscribe from this list](#) [update subscription preferences](#)