Minkyu Kim

✈ kimminq@kias.re.kr
https://minq92.github.io/Gaeul-Autumn/

EDUCATION

Ph.D., Mathematical science (*Advisor : Mikio Furuta*)   Apr 2018 - Mar 2023
Graduate School of Mathematical Sciences, The University of Tokyo
"Finite path integral model and toric code based on homological algebra."
Dean's Prize 2023 : awarded to students with superior grades who are expected to earn Master's degree or Ph.D

leave of absence due to military service in Republic of Korea (Apr 2020- Dec 2021)

Master of Science, Mathematical science (*Advisor : Mikio Furuta*)   Apr 2016 - Mar 2018
Graduate School of Mathematical Sciences, The University of Tokyo
"A construction of TQFT using K-theory."
Dean's Prize 2018

Bachelor of Engineering, Applied physics (*Advisor : Yasunobu Nakamura*)   Apr 2012 - Mar 2016
Faculty of Engineering, The University of Tokyo
"A generation of on-demand microwave single photons with superconducting qubit."

PUBLICATIONS

[K1] M. Kim, "A generalization of Dijkgraaf-Witten theory."
Advances in Theoretical and Mathematical Physics 26.10 (2022): to be published

[K2] M. Kim, "A pair of homotopy-theoretic version of TQFT's induced by a Brown functor."
International Journal of Mathematics 32.08 (2021): 2150053. (45 pages)

[K3] M. Kim, "Kitaev's stabilizer code and chain complex theory of bicommutative Hopf algebras."
Communications in Mathematical Physics 385.1 (2021): 291-329.

[K4] M. Kim, "Integrals along bimonoid homomorphisms."
Applied Categorical Structures 29.4 (2021): 577-627.

[IKSYKKN] Ilves, Jesper, et al. (the 5th author), "On-demand generation and characterization of a microwave time-bin qubit."
npj Quantum Information 6.1 (2020): 1-7.

[YK] R. Yano and M. Kim, "Topological analysis of pattern formation in cooling granular gases confinded by elastic wall."
Journal of Physics Communications (2020): 015023. (42 pages)

PREPRINTS

[K5] M. Kim, "On a pair of extensions of Mayer-Vietoris functors."
arXiv preprint arXiv:2005.10621 (2022), submitted to a journal on Jun 2022.

[K6] M. Kim, "Homology theory valued in the category of bicommutative Hopf algebras."
arXiv preprint arXiv:2005.04652 (2020).

[KV] M. Kim and C. Vespa, "On analytic exponential functors on free groups."
in preparation.

RESEARCH TALKS (CLICK THE TITLES)

"On analytic exponential functors on free groups"   Feb 2024 (expected)
The 19th East Asian Conference on Geometric Topology, RIMS, Kyoto University

"On analytic exponential functors on free groups"   Jan 2024 (expected)
KAIST Geometry and Topology Fair, Busan

"Finite path integral model and toric code based on homological algebra."   Nov 2023
Topology Seminar, KAIST

"An obstruction problem associated with finite path integral."   Nov 2023
VISGAT, Korea Institute for Advanced Study

"Dijkgraaf-Witten theory and Toric code."   Oct 2023
Discrete, Algebraic and Geometric Structures, Tokyo Institute of Technology

"Finite path integral model and toric code based on homological algebra."   Oct 2023
Tokyo-Seoul Conference in Mathematics, 2023 Topology and Geometric Group Theory, University of Tokyo

"Interactions between Topology and Representation theory by Toric code."   Oct 2023
iTHEMS Math Seminar, RIKEN

"Finite path integral model and toric code based on homological algebra."   Aug 2023
the 70th Topology Symposium, Nara Women's University

"Finite path integral model and toric code based on homological algebra." *Silver workshop VI*, OIST	Aug 2023
"An obstruction problem associated with finite path-integral." *Tuesday Seminar on Topology*, University of Tokyo	Nov 2022
"Toric code induced by bicommutative Hopf algebras." *CREST Research Seminar on Theoretical studies of topological phases of matter*, online	Jul 2021
"An extension of homology theory to a sequence of TQFT's." *Tsukuba Workshop for Young Mathematicians 2020*, Tsukuba Center of Institutes	Feb 2020
"A sequence of TQFT's associated with (co)homology theory." *Mathsci freshman seminar 2020*, Nagoya University	Feb 2020
"Dijkgraaf-Witten theory." *Discrete, Algebraic and Geometric Structures I*, Tokyo Institute of Technology	Jan 2020
"Commutative and cocommutative Kitaev lattice model and homology theory." *Poisson geometry and related topics*, Ritsumeikan University	Dec 2019
"A characterization of convective precipitation by persistent homology." *FMSP Research Seminar on Social and Mathematical practice*, University of Tokyo	Nov 2019
"A generalization of Dijkgraaf-Witten theory." *Kansai Gauge theory Seminar*, Kyoto University	Feb 2019
"A K-theoretical Dijkgraaf-Witten theory." *East Asian Conference on Gauge theory and Related topics*, Kyoto University	Sep 2018
"A construction of TQFT using K-theory." *Mini-Workshop on Topological Phases and K-theory*, AIMR	Mar 2018

WORKING GROUPS (CLICK THE TITLES)

Higher category and QFT seminar (I gave three talks about cobordism hypothesis based on Schommer-Pries.)	Aug 2022- present
Atlas of geometry : a seminar on geometry held in Tokyo and Kyoto alternatively (I gave a talk about extended Dijkgraaf-Witten theory on Feb 2020.)	

TEACHING ASSISTANTSHIPS

Mathematics II PEAK, The University of Tokyo	Autumn semester 2022
Geometry I /Geometry Special Exercise I, The University of Tokyo	Spring semester 2022
Mathematics II PEAK, The University of Tokyo	Spring semester 2022
Linear Algebra Exercise, The University of Tokyo	Autumn semester 2019
Geometry I /Geometry Special Exercise I, The University of Tokyo	Spring semester 2019
Geometry I /Geometry Special Exercise I, The University of Tokyo	Spring semester 2018
Advanced Calculus, The University of Tokyo	Spring semester 2016

PROFESSIONAL EXPERIENCE

Social service agent : an alternative military service (I took care of students in Cheonan-si public welfare center for teenagers, Korea.)	May 2020 - Dec 2021

TEACHING EXPERIENCE

Volunteer tutor for middle school students (I taught mathematics at Cheonan-si public welfare center for teenagers, Korea.)	Jan 2022 - Mar 2022
Private tutor for middle school and high school students (I taught mathematics as a part-time job.)	2015 - 2021

SCHOLARSHIPS

Leading Graduate Course for Frontiers of Mathematical Sciences and Physics (with a break between Apr 2020 - Mar 2022 due to military service.)	Apr 2018 - Mar 2023
The University of Tokyo Fellowship Special Scholarship Program for International Students	Apr 2016 - Mar 2018
Korea-Japan Joint Scholarship Program for Science and Engineering Students	Mar 2011 - Mar 2016

PROGRAMMING SKILLS

Python
   - applied to compute simulations of experiments in [IKSYKKN]
   - applied to find out an example in [K6]

Homcloud : an open source program developed by Hiraoka laboratory at RIKEN
   - applied to compute persistent homology in [YK]

Language Proficiency

Korean - Native

English - Upper intermediate

Japanese - Proficient