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沖縄科学技術大学院大学

VISITING PROGRAM

TSVP TALK

Freeness and Simplicity Revisited: Sifting and Bricks

2025
MON. **Jul. 28**

15:00–16:00

HYBRID L5D23, ZOOM



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A central subject in the representation theory of rings is to understand modules over a given ring. Among them, two classes of modules over a ring A are particularly fundamental. One is the class of free modules (i.e., direct sums of A), and the other is the class of simple modules (i.e., modules without proper submodules). When A is a field, all modules are both free and semisimple (i.e., direct sums of simple modules). However, for general rings, these two types of modules are rather exceptional and have been extensively generalized.

In this talk, I will introduce sifting complexes and bricks, which can be viewed as broad generalizations of free modules and simple modules, respectively. In addition, I will present some recent developments in the study of semibricks and 2-term sifting complexes, focusing on their interplay with the complete lattice of torsion classes and with non-singular fan in the real Grothendieck group.

University of Tokyo

Osamu Iyama

Osamu Iyama is a Professor at the Graduate School of Mathematical Sciences, The University of Tokyo, Japan. His research investigates various central notions in algebra with wide-ranging applications to geometry, combinatorics, and related areas. He has developed several foundational concepts and theories, among them cluster tilting, τ -tilting, sifting, mutation, higher Auslander algebras, and Geigle-Lenzing complete intersections, which have inspired extensive subsequent research by many other researchers.

Iyama was an invited speaker at the International Congress of Mathematicians (ICM) in 2018 and has received several prestigious awards, including the Frontiers of Science Award, the Inoue Prize for Science, the JSPS Prize, the Spring Prize, and the inaugural ICRA Award. He currently serves on the editorial boards of five international mathematics journals.

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