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Kyoto University / Vanderbilt University



June 11 - 19, 2015

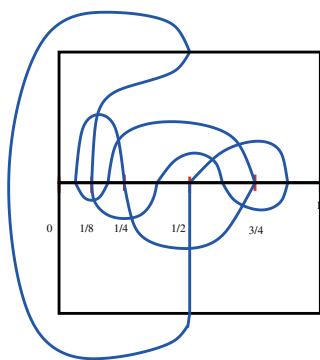
Thursday, June 11	10:00 - 12:00
Friday, June 12	10:00 - 12:00
Monday, June 15	15:00 - 17:00
Wednesday, June 17	10:00 - 12:00
Friday, June 19	10:00 - 12:00

127 Conference Room
Faculty of Science Bldg. #3,
Kyoto University

SGU 数学特別講義 (作用素環論)

An Introduction to Subfactors in Mathematics and Physics

◆本講義は SGU 数学特別講義 (作用素環論) として大学院の学生には 1 単位認定されます。



We intend to describe the current state of classification of subfactors and attack the question of whether all subfactors have something to do with quantum field theory, including an appearance of Richard Thompson's groups F and T .

Lecture 1. Introduction to von Neumann algebras. Definition and examples. Von Neumann density theorem. Factors of types I, II and III.

Tomita-Takesaki theory and Connes decomposition and classification. Hyperfiniteness.

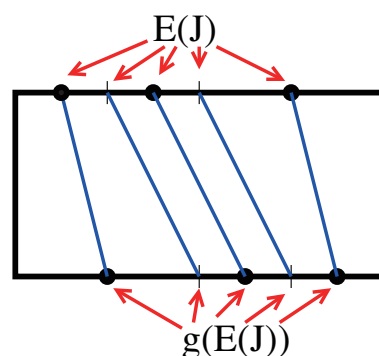
Lecture 2. Subfactors and elementary examples. Index in the type II case. Bimodules. The tower of relative commutants and restrictions on index values. Construction of examples. Braid group representations and knot polynomials.

Lecture 3. Kauffman diagrams for the Temperley-Lieb algebra. Planar algebras, lambda lattices - the standard invariant of a subfactor and reconstruction. Random matrices with a real number of matrices. Tensor categories, 2-categories. Endomorphisms and the type III approach.

Lecture 4. Classification of small index subfactors. Izumi's Cuntz

algebra approach. Skein theory presentations of subfactors, the exchange relation, the Yang-Baxter equation and the jellyfish algorithm.

Lecture 5. Algebraic quantum field theory, conformal field theory and scaling limits of statistical mechanical models. Hilbert spaces from planar algebras-a toy algebraic QFT and the Thompson groups. Knots and links from the Thompson groups.



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