

Name Itaru TERADA

Research field Group theory and combinatorics, Lie groups/Lie algebras/representation theory

Key words Group representations, Young diagrams, Robinson-Schensted correspondence

Present research The phrases listed in the “Research field” above have been chosen from a given table. In fact my speciality is not the so-called group theory, but rather in certain areas where representation theory (of Lie groups, Lie algebras their q -analogues, as well as related groups and algebras such as the Weyl group and the Hecke algebra) and algebraic combinatorics come across. In particular, the representation theory of certain algebras akin to classical Lie groups or the symmetric group provides a stage for combinatorial objects called Young diagrams and tableaux to play an important role. Moreover the Robinson–Schensted correspondence, being a quite delicate construction involving Young tableaux, has various interpretations in terms of invariants of posets, crystal basis for certain quantum groups, and certain algebraic varieties related to representation theory. My current research surrounds these topics. Symmetric functions are also related.

Notice for the students Some familiarity with basics of the representations of finite groups or the theory of Lie groups, Lie algebras or the basic algebraic part of their representation theory is welcome. Algebraic methods in general will also be likely to be used, so a certain familiarity in basic ideas of algebra covered in the algebra course for the 3rd-year undergraduate students is also a recommended prerequisite. Knowledge in combinatorics itself is not necessary. Basic skill in mathematics in general is more important. An additional background and interest in a different area can also help future development in research. Many books covering basic materials in group representations are available. Concrete aspects are also discussed, for example, in B. Sagan’s “The Symmetric Groups”. Reading such books referring to additional literature as necessary will also provide a basic training for reading books in mathematics. Reading books such as J. E. Humphreys’ “Introduction to Lie algebras and representation theory” or Chapter 1 of I. G. Macdonald’s “Symmetric functions and Hall polynomials” is of course welcome. When studying a general theory, it is desirable to complement it with concrete understanding.