Graduate lecture

An introduction to Young tableaux

Abstract

We survey some of the basic combinatorial properties of standard Young tableaux, including the hook-length formula, the RSK algorithm, the connection with increasing/decreasing subsequences of permutations, and the extension to oscillating tableaux.

Colloquium 1

Increasing and decreasing subsequences and their variants: Part I

Abstract

A survey of the subject of increasing and decreasing subsequences of permutations will be given. Topics will include the RSK algorithm, the Erdős-Szekeres theorem, enumerative results, Ulam's problem on the distribution of the length $is(w)$ of the longest increasing subsequence of a permutation w of $1, \ldots, n$, the result of Logan-Shepp and Vershik-Kerov on the expected value of $is(w)$, the breakthrough of Baik-Deift-Johansson relating $is(w)$ to the Tracy-Widom distribution, and extensions of the previous topics to involutions and fixed-point free involutions.

Colloquium 2

Increasing and decreasing subsequences and their variants: Part II

Abstract

Three variants of increasing/decreasing subsequences of permutations will be discussed: (1) the theory of pattern avoidance, (2) crossings and nestings of matchings and set partitions, and (3) alternating subsequences of permutations.