Chevalley bases for Lie algebras and the combinatorics of Kac's asymmetry function

Richard Green (University of Colorado, Boulder)

A Chevalley basis for a Lie algebra over \mathbb{C} is a basis for the algebra all of whose structure constants are integers. One of the standard constructions of Chevalley bases for simple Lie algebras over \mathbb{C} involves a certain function ε taking values in the set $\{\pm 1\}$; this function is sometimes called *Kac's asymmetry function*. Although the definition of this function may appear mysterious at first, I will argue that it has some natural combinatorial interpretations. Along the way, I will present combinatorial constructions of some interesting nonassociative algebras, including the somewhat confusingly named "loop algebras" associated to simple Lie algebras over \mathbb{C} .