

Green Polynomials in Representation Theory and Combinatorics

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Abstract: In 1955 J. A. Green computed the irreducible characters of the general linear group over a finite field. In his work, he made the connection with Hall's work on the Hall algebra; subsequently D. E. Littlewood found another description of what are now called the Hall-Littlewood polynomials. The Green polynomials are closely related to the Hall-Littlewood polynomials and they have a description for any crystallographic reflection group (due to Springer). In this talk I will survey results concerning Green polynomials. I plan to talk about their role in the classification of irreducible characters for any Chevalley group (work of Deligne-Lusztig, Springer, Kazhdan, Lusztig) and some of their geometric and combinatorial properties (work of Lusztig, Borho-MacPherson, Shoji, Lehrer-Shoji). If times permits, I'll mention recent attempts to define Green polynomials for arbitrary (complex) reflection groups.