

The Stirling-Eulerian Polynomials and the grammar calculus

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Carlitz and Scoville introduced the polynomials $A_n(x, y | \alpha, \beta)$, which defined on the set of permutations involving Eulerian-Stirling statistics, including descents, ascents, left-to-right maxima, and right-to-left maxima. Carlitz and Scoville obtained the generating function for these polynomials. In this talk, we present a new family of polynomials, $P_n(u_1, u_2, u_3, u_4 | \alpha, \beta)$, defined on permutations, which incorporate descent-Stirling statistics including valleys, exterior peaks, right double descents, left double ascents, left-to-right maxima, and right-to-left maxima. By employing the grammatical calculus introduced by Chen, we establish the connection between the generating function of $P_n(u_1, u_2, u_3, u_4 | \alpha, \beta)$ and the generating function of the (α, β) -Eulerian polynomials $A_n(x, y | \alpha, \beta)$. This connection can be specialized to derive many formulas involving the Eulerian polynomials and the peak polynomials and the double descent polynomials given by David-Barton, Elizalde and Noy, Entringer, Gessel, Kitaev, Stembridge, Petersen, Branden and so on.

报告人简介：季青，天津大学应用数学中心教授。主要从事计数与代数组合的研究，尤其关注与 q -级数，李代数及数论有关的组合问题，解决了 F. Dyson (沃尔夫奖获得者、美国科学院院士), G.E. Andrews (美国科学院院士), R. Stanley (美国科学院院士), D. Bressoud 等人提出的猜想和公开问题，相关成果发表在包括 J.

Reine Angew. Math., Adv. Math. (3 篇), Trans. Amer. Math. Soc. (2 篇), J. Combin.

Theory A (3 篇)等期刊上，并被多位著名学者在包括权威杂志 Notice AMS 上正面引用。