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A MULTIVARIABLE GENERALIZATION OF STIRLING-EULERIAN POLYNOMIALS

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We define a multivariable generalization of the Eulerian polynomials using linear and descent based statistics of permutations and establish the connection with the (α, t)-Eulerian polynomials based on cyclic and excedance based statistics of permutations. As applications of this connection, we obtain the exponential generating function for the multivariable Eulerian polynomials and γ-positive formulas of two variants of Eulerian polynomials. Furthermore, we show that enumerating the cycle André permutations with respect to the number of drops, fixed points and cycles gives rise to the normalised γ-vectors of the (α, t)-Eulerian polynomials. We also discuss a partial q-analogue of our polynomials, which gives a combinatorial interpretation of a subfamily of Nadeau-Tewari's remixed Eulerian numbers.

This is joint work with Jiang Zeng.