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Unipotent symmetric functions

Symmetric functions are often thought of in relation to the representation theory of the symmetric groups, but they also have a representation theoretic connection to unipotent objects for the general linear groups over a finite field, $\mathrm{GL}_n(\mathbb{F}_q)$. In this talk I will describe how this connection can be used to realize two well known symmetric functions, the chromatic quasisymmetric function of an indifference graph and the unicellular LLT polynomial, via certain $\mathrm{GL}_n(\mathbb{F}_q)$ representations. The representations in question arise naturally from an investigation of the subgroup $\mathrm{UT}_n(\mathbb{F}_q)$ of unipotent upper triangular matrices, and this process suggests a more general method of constructing families of symmetric functions. As an added bonus, this construction also gives a new perspective on the relationship between chromatic quasisymmetric functions and unicellular LLT polynomials.