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Supersymmetric polynomials over fields of positive characteristic

Harish-Chandra isomorphism for Lie algebra $\mathfrak{g}$ over a field K of characteristic zero case yields a description of its central characters and central blocks. This is related to the invariants of the adjoint representation of $\mathfrak{g}$ and for $\mathfrak{g} = \mathfrak{gl}(m)$ to symmetric polynomials.

Such a result extends to Lie superalgebras $\mathfrak{g}$ over K of characteristic zero, and in the case of the general linear superalgebra $\mathfrak{gl}(m|n)$ it leads to supersymmetric polynomials. We review the description of supersymmetric polynomials in characteristic zero and $p > 2$.

For Lie algebras in characteristic $p > 0$, the Harish-Chandra isomorphism still exists but takes a slightly different form.

Our interest lies in the general linear supergroup $GL(m|n)$ in characteristic $p > 2$. We consider the distribution algebra $Dist(T)$ of the maximal torus T of G, which has a basis consisting of the product of certain binomial coefficients. We explain how to extend the supersymmetric property from the characteristic zero case to the case of positive characteristic and describe a basis of the supersymmetric elements of $Dist(T)$ as a union of supersymmetric elements in the Frobenius kernels.