

Zongzhu Lin

Kansas State University, Manhattan, Kansas, USA

Representations of quantum groups at p^r th root of 1 over p -adic fields

Abstract: Given a reductive algebraic group G defined over a finite field \mathbb{F}_p , there are finite groups $G(\mathbb{F}_{p^r})$ and there are also infinite groups such as $G(\overline{\mathbb{F}}_p)$. The representations of the the finite groups $G(\mathbb{F}_{p^r})$ over complex numbers are completely controlled by their irreducible characters, which are also described in terms of character sheaves on the algebraic varieties G . The finite dimensional representations of the infinite groups $G(\mathbb{F}_{p^r})$ over the $\overline{\mathbb{F}}_p$ is closed related (but not completely controlled) by the rational representations of the algebraic group G and that of Frobenius kernel G_r . However the representation theory of the infinite group $G(\overline{\mathbb{F}}_p)$ over an algebraically closed field \mathbf{k} has not been studied seriously. If the characteristic of \mathbf{k} is different from p , essentially there are no finite dimensional non-trivial representations. But $G(\overline{\mathbb{F}}_p)$ can have un-countable number of irreducible representations. The representations of the distribution algebra (also called hyper algebra) $\text{Dist}(G)$ can provide representations of the infinite group $G(\overline{\mathbb{F}}_p)$ over the field $\mathbf{k} = \overline{\mathbb{F}}_p$. The irreducible representations in the category \mathcal{O} are parametrized by the $\mathbb{Z}_p(\Phi^+)$. The representations of quantum groups at p^r th roots of 1 over p -adic fields will also play a role in constructing irreducible representations of the infinite group $G(\overline{\mathbb{F}}_p)$ over p -adic fields. This talk is to construct highest weight representations of quantum groups at p^r th roots of unit over p -adic fields, in the category \mathcal{O} .