# $\mathrm{G}_2(\mathbb{F}_q)$-INVARIANTS OF REPRESENTATIONS OF $\mathrm{D}_4(\mathbb{F}_q)$

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## Abstract

Let $\mathbb{F}_q$ be a finite field of order $q$ and whose characteristic is not equal to 2 or 3. Let $F$ denote the Frobenius automorphism which topologically generates the Galois group $\mathrm{Gal}(\overline{\mathbb{F}}_q/\mathbb{F}_q)$.

Let $G'$ denote a split group of type $\mathrm{D}_4$ over $\mathbb{F}_q$, that is, $G'$ is either the split orthogonal group $\mathrm{SO}_8$, $\mathrm{PSO}_8$ or $\mathrm{Spin}_8$. It contains a split group $\mathrm{G}_2$ over $\mathbb{F}_q$. Let $G'(\mathbb{F}_q)$ and $\mathrm{G}_2(\mathbb{F}_q)$ denote the $\mathbb{F}_q$ points of $G'$ and $\mathrm{G}_2$ respectively. In this talk would like to calculate the $\mathrm{G}_2(\mathbb{F}_q)$-invariants of certain representations of $G'(\mathbb{F}_q)$.