Character formula for
representations of local quaternion
algebras (wildly ramified case)

By

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Introduction

Let F be a p-adic local field and D be a quaternion division algebra over F. The character of an irreducible admissible representation of the multiplicative group $D^\times$ of D was studied in [GG] and [HSY]. Especially in [HSY] the character formula is explicit and simple. But it has been dealt only the case $p \neq 2$, what we call, tamely ramified case. By Jacquet-Langlands correspondence ([JL]) between representations of $D^\times$ and discrete series representations of $GL_2(F)$, the character foumula for $D^\times$ gives the character formula for $GL_2(F)$ on the set of elliptic regular elements. The computation of character of the representation of GL_2 and related gourps has been the object of much study ([SS], [Sh], [Sal], [T], [Sai]). Except [Sai], it has been also assumed $p \neq 2$. Tunnel and Saito shows ([T], [Sai]) the character of the representation is expressed by ε-factor of the base change lift of the representation of $GL_2(F)$ to quadratic extensions (including the case $p = 2$ in [Sai]). But it is not easy to compute the ε-factor of the base change lift when $p = 2$. Here we do not treat the base change lift. Our tactics is the same as [HSY], but the wild ramification brings us many difficulties. We proceed as follows. In section 1, we treat the construction of the representation of $D^\times$. The set of the representations with even conductor is parameterized by the set of the regular characters of unramified quadratic extension of F and their characters and completely calculated ([HSY] Corollary 1.7). Therefore we treat only the representation with odd conductor. The construction of these representation is well-known, but we need a slight modification to compute the character completely. We define a parameter for the representation, which is called 'generic data'. It is a triple (K, θ, γ) consisting of a ramified quadratic extension K of F, a quasi-character of θ of $K^\times$ and an element γ of K which satisfy some conditions in Definition 1.1. We note if the Swan conductor t_K of K is 0, i.e. $p \neq 2$, the parameter γ is dispensable since θ determines γ. We associate an irre-