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DEGREES AND FORMAL DEGREES FOR DIVISION ALGEBRAS AND GL_n OVER A p-ADIC FIELD

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We compute in the tame case, the degrees of the irreducible representations of a division algebra and the formal degrees of the discrete series of $GL(n)$ over a p-adic field and compare them.

1. Introduction. Let F be a p-adic field of characteristic zero, and let $G = GL_n(F)$. *Throughout this paper, we assume that* $(n, p) = 1$ (*the tame case*). The discrete series of G consists of (equivalence classes of) irreducible, unitary representations of G whose matrix coefficients are square integrable $(\text{mod}\, Z)$, where Z is the center of G. The discrete series splits into two distinct classes ([**HC2**], [**J**]):

(1) Supercuspidal representations: irreducible unitary representations whose matrix coefficients are compactly supported $(\text{mod}\, Z)$;

(2) Generalized special representations: irreducible unitary representations whose matrix coefficients are square integrable $(\text{mod}\, Z)$, and which are subrepresentations of representations induced from a proper parabolic subgroup of G.

The supercuspidal representations of G were constructed by Howe [**H2**]. The first proof of the fact that all supercuspidal representations of G are contained in Howe's construction was given by Moy [**M**]. The generalized special representations of G were characterized by Bernstein-Zelevinsky ([**BZ**], [**Z**]). We note that the Bernstein-Zelevinsky construction uses the supercuspidal representations of $GL_m(F)$ where $m|n$ $(m < n)$. Since $(m, p) = 1$ in the present case, the requisite supercuspidal representations can be obtained from Howe's construction.

The key to the study of the supercuspidal representations of G is the notion, due to Howe [**H2**], of an admissible character of an extension of degree n over F. In fact, the supercuspidal representations of G are parametrized by (conjugacy classes of) admissible characters of extensions of degree n over F, and generalized special representations are parametrized by (conjugacy classes of) admissible characters of