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## On the degree of certain local $L$-functions. (English) Zbl 1321.22018

**Pac. J. Math. 276, No. 1, 1-17 (2015).**

Let $\pi$ be an irreducible cuspidal representation of GL$(n, F)$, where $F$ is a $p$-adic field. By a result of Bushnell and Kutzko, the group of unramified self-twists of $\pi$ has cardinality $n/e$, where $e$ is the $\mathcal{O}_F$-period of the principal $\mathcal{O}_F$-order in $M(n, F)$ attached to $\pi$. This is the degree of the local Rankin-Selberg $L$-function $L(s, \pi \times \pi^\vee)$. This paper computes the degree of the twisted tensor (or Asai), symmetric square, and exterior square $L$-functions associated to $\pi$. As an application, assuming $p$ is odd, the authors compute the conductor of the twisted tensor lift of a cuspidal representation, using also the conductor formula for pairs of cuspidal representations, of Bushnell, Henniart, Kutzko [{\it C. J. Bushnell} et al., J. Am. Math. Soc. 11, No. 3, 703--730 (1998; Zbl 0899.22017)].

Reviewer: Yuval Z. Flicker (Columbus)

**MSC:**

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|---|---|
| 22E50 | Representations of Lie and linear algebraic groups over local fields |
| 11F33 | Congruences for ($p$-adic) modular forms |
| 11F70 | Representation-theoretic methods in automorphic theory |
| 11F85 | $p$-adic theory, local fields |

**Keywords:**
Asai $L$-function; symmetric square $L$-function; exterior square $L$-function; degree of a local $L$-function