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On the $K(n)$ -invariants of a supersingular representation of $\mathrm{GL}_2(\mathbb{Q}_p)$. (English) Zbl 1322.22019

Berndt, Bruce C. (ed.) et al., The legacy of Srinivasa Ramanujan. Proceedings of the international conference in celebration of the 125th anniversary of Ramanujan's birth, University of Delhi, Delhi, India, December 17--22, 2012. Mysore: Ramanujan Mathematical Society (ISBN 978-93-80416-13-7/hbk). Ramanujan Mathematical Society Lecture Notes Series 20, 55-75 (2013).

Let p be a prime integer and let F be a p -adic field. The irreducible smooth modulo p representations of $\mathrm{GL}_2(F)$ are classified by [L. Barthel](#) and [R. Livné](#) [*J. Number Theory* 55, No. 1, 1--27 (1995; Zbl 0841.11026); *Duke Math. J.* 75, No. 2, 261--292 (1994; Zbl 0826.22019)]. The supersingular representations cannot be obtained as a subquotient of any principal series representation, and these representations are understood satisfactorily only when $F = \mathbb{Q}_p$. In this case, the classification of supersingular representations has been carried out by [C. Breuil](#) [*Compos. Math.* 138, No. 2, 165--188 (2003; Zbl 1044.11041)]. In the paper under review, the authors give a short and elementary proof of the results given by [S. Morra](#) [*Trans. Am. Math. Soc.* 365, No. 12, 6625--6667 (2013; Zbl 1280.22021); *J. Algebra* 339, No. 1, 252--303 (2011; Zbl 1239.22012)] for computing the K -socle filtration and the structure of the space of $K(n)$ -invariants of a supersingular representations of $\mathrm{GL}_2(\mathbb{Q}_p)$ in the regular case, by making use of the Iwahori-Hecke model for supersingular representations of $\mathrm{GL}_2(\mathbb{Q}_p)$. Here, $K = \mathrm{GL}_2(\mathbb{Z}_p)$ is the standard maximal compact subgroup of $\mathrm{GL}_2(\mathbb{Q}_p)$. They use the computations on the Iwahori-Hecke model of a regular supersingular representation, introduced by the authors in [*J. Algebra* 423, 1--27 (2015; Zbl 06377563)]. For the entire collection see [Zbl 1300.11002].

Reviewer: Manouchehr Misaghian (Prairie View)

MSC:

Cited in 1 Document

- 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:

principal congruence subgroup; Iwahori-Hecke model

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