HECKE CHARACTERS AND THE K-THEORY OF TOTALLY REAL AND CM NUMBER FIELDS

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Let F/K be an abelian extension of number fields with F either CM or totally real and K totally real. If F is CM and the Brumer-Stark conjecture holds for F/K, one can construct a family of $G(F/K)$-equivariant Hecke characters for F with infinite type equal to a special value of certain $G(F/K)$-equivariant L-functions. Greither and Popescu constructed l-adic imprimitive versions of these characters, for primes $l > 2$. I will show how the special values of these l–adic Hecke characters make it possible to construct $G(F/K)$-equivariant Stickelberger splitting maps in the Quillen localization sequence for F, extending my previous results for the base field $K = \mathbb{Q}$. The Stickelberger-splitting maps are also used to construct special elements in $K_{2n}(F)_l$ and analyze the Galois module structure of the group $D(n)_l$ of divisible elements in $K_{2n}(F)_l$. If n is odd, l does not divide n and $F = K$ is a fairly general totally real number field, the cyclicity of $D(n)_l$ will be discussed in relation to the classical conjecture of Iwasawa on class groups of cyclotomic fields and its potential generalization to a wider class of number fields. Finally, if F is CM, special values of l-adic Hecke characters are used to construct Euler systems in odd K-groups $K_{2n+1}(F, \mathbb{Z}/l^k)$.

This is joint work with Cristian Popescu