ON THE ZEROTH COHOMOLOGY GROUP OF SINNOTT'S MODULE

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Sinnott introduced his module over the group ring $\mathbb{Z}[G]$, where G is an abelian Galois group, as a module which is generated by several generators obeying the norm relations. He defined this module to study the circular units and the Gauss sums in a finite abelian extension K of $\mathbb{Q}$. Later on Oukhaba showed that a suitably defined group of elliptic units in a finite abelian extension K of an imaginary quadratic field F also form an example of Sinnott's module.

Circular units and Gauss sums appear in a cyclotomic field while elliptic units are defined in a ray class field of the imaginary quadratic field F. Each time they are transported to the given field K by norms. By considering the intersection with K instead of taking the norms to K we can get a larger module. Even though we have explicit generators of the module obtained by norms, we do not have explicit generators of this larger module obtained by the intersection.

In this talk we shall discuss a few examples when the knowledge of explicit nontrivial elements of the zeroth cohomology group of Sinnott's module gives new explicit elements of this intersection. As an application, we show that sometimes these new explicit elements can be used in a modified Thaine-Rubin machinery to produce more annihilators of the ideal class group of K (in comparison with the standard approach).

This is joint work with Cornelius Greither (München, Germany)