

EXTRACTING ROOTS OF CIRCULAR UNITS OR GAUSS SUMS

Radan Kucera
(Masaryk University, Brno)

Due to the definitions, circular units and Gauss sums appear in cyclotomic fields. Let K be an abelian field, i.e. a finite Galois extension of the field \mathbb{Q} of rational numbers with an abelian Galois group $\text{Gal}(K/\mathbb{Q})$. Following Sinnott we can use norms to transfer all circular units and Gauss sums to K from all cyclotomic fields to obtain the group C of circular units of K and, via Stickelberger factorization of Gauss sums, the Stickelberger ideal S of K .

The aim of this talk is to describe a few special types of abelian fields where we are able to extract nontrivial roots of circular units or Gauss sums. For these types of abelian fields this approach allows to enlarge C and S which can give an interesting result on the class group of K , for example a nontrivial divisor of the class number of K or a new explicit annihilator of the class group of K .