

Online Number Theory Seminar

24 November 2023. – 17:00-17:50

K. Győry:

Reduction theory of integral polynomials with given discriminant, various applications, among others to monogenic number fields (brief survey and some new joint results of Bhargava, Evertse, Győry, Remete and Swaminathan)

In our talk, we give a brief overview of the theory. First we recall the classical results of Lagrange (1773) and Hermite (1851) in the quadratic and cubic cases. Then we present the most significant, general theorems obtained by Birch and Merriman (1972) and independently, for monic polynomials and in effective form by Győry (1973), and later by Győry (1974), Evertse and Győry (1991, 2017). Following Bhargava, Evertse, Győry, Remete and Swaminathan (2023), we shortly compare these results with a long-forgotten theorem of Hermite (1857), showing that these results from the 1970's and later are much better and deeper. Then, as consequences and applications of theorem of Győry (1973), general effective finiteness theorems will be presented, among others for monogenic number fields and power integral bases. Further, algorithmic/computational results/methods concerning monogeneity of number fields of degree at most 6 will be discussed. Finally, some other related results will be stated and several open problems will be proposed.

This is Part I of a series of lectures. Part II will be given by L. Remete on 1st December, providing a detailed treatment of our joint work BEGyRS (2023) on Hermite results, in particular comparing the equivalences of polynomials used by Hermite, Birch and Merriman, and Győry, respectively. Part III will be delivered by J. H. Evertse on 8th December on his new general results on rationally monogenic orders and orders with few rational monogenizations.