Orders in Quartic Number Fields and Classical Diophantine Equations

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665 Commonwealth Avenue, CDS 548
Tea and cookies at 3:30

Abstract: An order $O$ in an algebraic number field is called monogenic if over $\mathbb{Z}$ it can be generated by one element. It is known that there are finitely equivalence classes $\alpha \in O$ such that $O = \mathbb{Z}[\alpha]$, where two algebraic integers $\alpha$ and $\alpha'$ are called equivalent if $\alpha + \alpha'$ or $\alpha - \alpha'$ is a rational integer. An interesting problem is to count the number of monogenizations of a given monogenic order. First we will note, for a given order $O$, that

$$O = \mathbb{Z}[\alpha] \quad \text{in} \ \alpha,$$

is indeed a Diophantine equation. Then we will modify some old algorithmic methods in classical Diophantine number theory to obtain new and improved upper bounds for the number of monogenizations of a quartic order.