Abstract

In this thesis, we develop algorithms for the calculation of Galois groups of Eisenstein polynomials $f(x)$ over a p-adic field. Our main tool is the so-called ramification polygon of $f(x)$. That is the Newton polygon of $f(\alpha x + \alpha)/\alpha^n x$, where α denotes a root of $f(x)$ and n the degree of $f(x)$. We present a fast algorithm for polynomials with one-sided ramification polygon and a more expensive method for polynomials with two segments. In the case of an arbitrary Eisenstein polynomial we use the ramification polygon to speed up calculations concerning the splitting field. For example, we provide an algorithm for the determination of the maximal tamely ramified subfield of the splitting field.