

2-group Belyi Maps

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Abstract

This thesis concerns the explicit computation of Galois Belyi maps $\phi: X \rightarrow \mathbb{P}^1$ with monodromy group a 2-group. The motivation behind computing these so-called *2-group Belyi maps* comes from Beckmann's theorem which relates the primes of bad reduction of the algebraic curve X to the primes dividing the order of the monodromy group of ϕ . The computation has two parts. The first is a combinatorial computation to enumerate the isomorphism classes of 2-group Belyi maps. This computation provides evidence to a conjecture that every 2-group Belyi map is defined over an abelian extension of \mathbb{Q} . A partial proof of the conjecture for certain 2-groups is given. The second part is an explicit algorithm to compute equations for the curve X . All computations are carried out using **Magma**. The source code for these implementations is available at the following link.

<https://github.com/michaelmusty/2groupdessins>