

# BERNOULLIS TAFELRUNDE

GRADUATE STUDENT SEMINAR

Thursday, 8 October, 12:15-13:00  
Seminarraum 00.003, Spiegelgasse 1

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## Calculating Gauss norms in polynomial continued fractions

### ABSTRACT

For a monic polynomial  $D$  with integer coefficients, one may compute  $\sqrt{D}$  as a Laurent series with rational coefficients, which has a continued fraction expansion over polynomials (with rational coefficient). Abel showed that this continued fraction is periodic if and only if the corresponding polynomial Pell equation has non-trivial solutions. We can also perform this construction for  $D$  modulo an odd prime  $p$ , now with a finite base field, in which case either  $D \pmod{p}$  is square, or the continued fraction of  $\sqrt{D} \pmod{p}$  is periodic. If the original continued fraction is non-periodic, relating the two continued fractions gives information on where  $p$  appears as a denominator. Using a  $p$ -adic Gauss norm, this can be somewhat quantified, and I will give a fairly explicit description for the case  $\deg D = 4$ .