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Distribution of class numbers in continued fraction families of real quadratic fields

Dirichlet's class number formula for real quadratic fields shows that for a fundamental discriminant $d > 0$, the class number of $\mathbb{Q}(\sqrt{d})$ denoted by $h(d)$ depends on the ratio of $L(1, \chi_d)$ and the logarithm of the fundamental unit. In order to study the distribution of class numbers, one must therefore control these two values. One strategy is to consider a family of discriminants for which the fundamental unit is explicitly given in terms of d, and then study the distribution for $L(1, \chi_d)$ for d in that family. Some examples of such families were studied by Chowla and Yokoi. The fundamental unit in these cases was as small as possible, and it was shown that (eventually) all of the d in these families have $h(d) > 1$. In a recent preprint, A. Dahl and Y. Lamzouri take the above approach to studying the distribution of class numbers in Chowla's family, constructing a random model for $L(1, \chi_d)$ for d in the family. In a joint work with V. Kala, we observe that Chowla's and Yokoi's families belong to a larger class of families whose fundamental units are as small as possible and that arise from continued fractions. These families are defined by solutions to the equation $\sqrt{d} = [\lfloor\sqrt{d}\rfloor, \overline{u_1, u_2, \ldots, u_{s-1}, 2\lfloor\sqrt{d}\rfloor}]$ with fixed coefficients $u_1, u_2, \ldots, u_{s-1}$.