Summary: Let $k$ be a number field, $O_k$ its ring of integers, and $f(x, y) \in O_k[x, y]$ an integral binary form of degree $d \geq 3$. Minimality of $f(x, y)$ is equivalent to residual semistability. In this paper, we give a method to explicitly determine a binary form, $k$-equivalent to $f$, which is residually semistable. For any prime $p \in O_k$.

In the last part of the paper we compare the GIT height from [S. Zhang, Compos. Math. 104, No. 1, 77–105 (1996; Zbl 0924.11055)] with weighted height in [L. Beshaj et al., J. Number Theory 213, 319–346 (2020; Zbl 1440.11114)] and show that for strictly semistable forms their logarithmic weighted height $s_k > 0$, for $d \leq 10$. Moreover, we show that binary forms with logarithmic weighted height $s_k(\xi(f)) = 0$ exist for any degree $d \geq 3$.

MSC:

20F70 Algebraic geometry over groups; equations over groups
14H10 Families, moduli of curves (algebraic)
14Q05 Computational aspects of algebraic curves
14H37 Automorphisms of curves

Keywords:
stability; binary forms; weighted heights

Full Text: Link

References:

[13] Von Gall, Über das vollst. endliche System einer binär Form, Ann. 17 (1880), 1, 139-152. MR1510062

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