1148-11-112 **Jordi Pujolàs*** (`jpujolas@matematica.udl.cat`), Jaume II, 69, 25001 Lleida, Lleida, Spain.
Bisection and trisection polynomials for genus 2.

For every divisor D in the Jacobian of a genus 2 curve $\mathrm{C} : y^2 = f(x)$ over a field k, we compute a polynomial $p_D(x) \in k[x]$ with the following property:

$$\exists D' \in \mathrm{Jac}(\mathrm{C})(k) \mid 2D' = D$$

$$\Longleftrightarrow$$

$$\exists\, \alpha \in k \mid p_D(\alpha) = 0.$$

Let $D_2 = [u_2(x), v_2(x)] \in \mathrm{Jac}(\mathrm{C})(k)$. The set $\frac{1}{2}D_2 = \{D \in \mathrm{Jac}(\mathrm{C})(k) \mid 2D = D_2\}$ is parametrised by the slope m_1 of a line $m_D(x) = m_1x + m_0$ hidden in Cantor's doubling algorithm, where momentarily the unreduced 1st coordinate $u_2(x)$ looks like

$$\frac{f(x) - (m_D(x)u_2(x) - v_2(x))^2}{-m_1^2 u_2(x)}.$$

Equating with

$$u(x)^2 = (x^2 + u_1x + u_0)^2$$

one obtains 4 equations in 4 variables m_1, m_0, u_1, u_0 whose solution $p_D(x)$ depends on D_2 and the $f(x)$ only. Our $p_D(x)$ has been used in point counting and in the computation of periods of curves of genus 1 and 2. Exchanging 2 by 3, our method can be further pushed to compute the whole 3-torsion subgroup and trisections of divisors in Jacobians of genus 2 curves in even characteristic. This is joint work with Josep M. Miret, Ana Rio and Nicolas Thériault. (Received January 28, 2019)