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Cuspidal plane curves, syzygies and a bound on the MW-rank

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Let $C=Z(f)$ be a reduced plane curve of degree $6k$, with only nodes and ordinary cusps as singularities. Let I be the ideal of the points where C has a cusp. Let $\oplus S(-b_i)\to \oplus S(-a_i) \to S\to S/I$ be a minimal resolution of I. We show that $b_i\leq 5k$. From this we obtain that the Mordell-Weil rank of the elliptic threefold $W:y^2=x^3+f$ equals $2#\{i\mid b_i=5k\}$. Using this we find an upper bound for the Mordell-Weil rank of W, which is $1/18 (125+\sqrt{73}-\sqrt{2302-106\sqrt{73}})k+l.o.t.$ and we find an upper bound for the exponent of (t^2-t+1) in the Alexander polynomial of C, which is $1/36(125+\sqrt{73}-\sqrt{2302-106\sqrt{73}}) k+l.o.t.$. This improves a recent bound of Cogolludo and Libgober almost by a factor 2.

Comments:	Slightly improved bound; Section 3 is rewritten; Several minor corrections in the other sections
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