RATIONAL POINTS ON SUPERELLIPTIC CURVES OF ERDŐS-SELFRIDGE TYPE

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ABSTRACT. For the superelliptic curves of the form

$$(x+1)\cdots(x+i-1)(x+i+1)\cdots(x+k) = y^{\ell} \tag{1}$$

with $x, y \in \mathbb{Q}$, $y \neq 0$, $k \geq 3$, $1 \leq i \leq k$, $\ell \geq 2$ prime, Das, Laishram, Saradha [2018] and Edis [2019] showed that the curves have no rational points for $\ell \geq e^{3^k}$. The double exponential bound obtained in these papers is far from the reality. In this talk, we discuss the superelliptic curves for small values of k, in particular, we find all the rational points on the curve (1) for $4 \leq k \leq 8$.