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On The Rank of a Subfamily of Elliptic Curves Extracted From $E(t)$: $y^2 = x^3 - (a + bt)x$

Informations

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Abstract

We extract a subfamily

$$E(k): y^2 = x^3 + (k^2 - 1)x$$

of elliptic curves from the curve

$$E(t): y^2 = x^3 - (a + bt)x .$$

Then, by imposing, successively, points on the obtained curves $E(k)$, we increase the rank.

At the end, we show that its rank is at least 3 over $\mathbb{Q}(k)$.

References

[1] Mark van Hoeij, An algorithm for computing the Weierstrass normal form, ISSAC'95- 7/95 Montreal, Canada, 1995, 90-95.

[2] Ahmed El Amine Youmbai, Muhammed Uludağ, Djilali Behloul, Elliptic curve involving subfamilies of rank at least 5 over $\mathbb{Q}(t)$ or $\mathbb{Q}(t, k)$, Hacettepe Journal of Mathematics & Statistics, Volume 50 (3) (2021), 721 – 731.

[3] Dustin Moody, Mohammad Sadek, Arman Shamsi Zargar, Families of elliptic curves of rank ≥ 5 over $\mathbb{Q}(t)$, Rocky Mountain Journal of Mathematics, Volume 49, 2019, 2253-2266.

[4] Farzali Izadi, Arman Shamsi Zargar, A Note on Twists, Iranian Journal of Mathematical Sciences and Informatics, Vol. 12 (1), 2017, 27-34.

[5] Ian Cornnell, Elliptic Curves Handbook, 1999.

[6] Joseph H. Silverman, Advanced Topics in The Arithmetic of Elliptic Curves, 1994.