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Sarah Arpin, Richard Griffon, Libby Taylor* (lt691@stanford.edu) and **Nicholas Triantafillou**. *The arithmetic of an explicit family of superelliptic curves over function fields*. Preliminary report.

We consider the family of superelliptic curves with Weierstrass equation $y^b = x^a + t^q - t$ over a function field of characteristic p . We compute the L-functions of the Jacobians of such curves and compute various arithmetic invariants of the Jacobian, such as the regulator, local Tamagawa numbers, and the Tate-Shafarevich group (which we prove is finite). The behavior of such invariants is strongly dependent on the congruence class of $p \bmod ab$; for example, the analytic rank is zero when $p \equiv 1 \pmod{a}$ and $p \equiv 1 \pmod{b}$, but is unbounded as $q \rightarrow \infty$ when $p \equiv -1 \pmod{a}$. Our approach relies on the BSD conjecture for such Jacobians and an explicit computation of the L-function. (Received September 05, 2019)