

Meeting: 1003, Atlanta, Georgia, SS 32A, AMS Special Session on Arithmetic Algebraic Geometry, I

1003-11-184 **Keith Conrad***, Dept. of Mathematics, Univ. of Conn., 196 Auditorium Road U-3009, Storrs, CT 06269-3009. *Elevated rank in positive characteristic.*

In 1982, Cassels and Schinzel gave an example of an elliptic curve over $\mathbf{Q}(T)$ of rank 0 such that, for all but finitely many specializations at $T = t \in \mathbf{P}^1(\mathbf{Q})$, the corresponding elliptic curve over \mathbf{Q} has root number -1 and thus (under the parity conjecture) should have rank > 0 . We call such a phenomenon, where rank under all but finitely many specializations exceeds the generic rank, "elevated rank" over \mathbf{Q} . Further examples of elevated rank over \mathbf{Q} were given by Rohrlich (again, assuming the parity conjecture). In all the examples, the elliptic curves over $\mathbf{Q}(T)$ are isotrivial.

Granting some plausible conjectures, non-isotrivial examples of elevated rank over \mathbf{Q} do not exist. But one of the plausible conjectures (from analytic number theory) is not true in characteristic p . Inspired by this, and assuming the parity conjecture, we can construct explicit non-isotrivial examples of elevated rank over a rational function field in all odd characteristics. (Received August 20, 2004)