

# Square-free orders for CM elliptic curves modulo $p$

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**Abstract.** Let  $E$  be an elliptic curve defined over  $Q$  and with complex multiplication. We consider the problem of determining an effective asymptotic formula for the number of primes  $p < x$ , of good reduction for  $E$ , for which the group of points of the reduction of  $E$  modulo  $p$  has square-free order. This problem is related to the 1976 elliptic curve analogue of Artin's primitive root conjecture formulated by Lang and Trotter, as well as with the 1988 question of Koblitz of determining the density of the primes  $p$  for which the group of points of  $E$  modulo  $p$  has prime order.

