

COMPUTING THE MORDPELL-WEIL GROUP (COMPLETE 2-DESCENT)

E/K elliptic curve, with $E[m] \subseteq E(K)$ for some $m \geq 2$.

• WEIL PAIRING: $e_m : E[m] \times E[m] \rightarrow \mu_m$

• KUMMER PAIRING: $k : E(K) \times \text{Gal}(K/k) \rightarrow E[m]$
 $(P, \sigma) \mapsto k(P, \sigma) = Q^\sigma - Q \quad \text{w/ } [m]Q = P.$

\downarrow induces $\delta_E : E(K) / {}_m E(K) \rightarrow \text{Hom}(\text{Gal}(K/k), E[m])$
 $P \mapsto \delta_E(P)$

