# Dynamical methods for rapid computations of L-functions

Let $f$ be a holomorphic or Maass cusp form on the upper half plane. We use the slow divergence of the horocycle flow on the upper half plane to get an algorithm to compute $L(f, 1/2 + iT)$ up to a maximum error $O(T^{-\gamma})$ using $O(T^{7/8+\eta})$ operations. Here $\gamma$ and $\eta$ are any positive numbers and the constants in $O$ are independent of $T$. We thus improve the current approximate functional equation based algorithms which have complexity $O(T^{1+\eta})$.