**Abstract**

An algorithm for solving discrete logarithms in jacobians of small genus hyperelliptic curves is presented and analyzed. This is a double large prime variation of the classical index-calculus algorithm. In order to analyze it, a simplified algorithm is introduced, whose behavior can be described by simple differential equations. The resulting complexity improves on the fastest known algorithms. The theoretical result is validated by computer experiments, showing that for genus 3 curves this algorithm is faster than Pollard Rho method even for rather small field sizes.