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1523 Greene Street, University of South Carolina, Columbia, SC 29208. *Lattice Points Close to a  
Smooth Curve and Applications.*

We review the recent progress on estimating the number of lattice points close to a smooth curve and present two new applications.

(I) We show that there exists an absolute constant  $C > 0$  such that for every positive integer  $n$ , there exist a prime  $p < Cn^{1/5}(\log n)^2$  such that  $n + p$  is a squarefree number (joint work with M. Filaseta and S. Graham).

(II) J.-P. Serre has shown that the largest possible number of  $\mathbb{F}_q$  rational points on curves of small genus over a finite field  $\mathbb{F}_q$  of  $q$  elements depends on the property  $p \mid [2q^{1/2}]$ , where  $p$  is the characteristic of  $\mathbb{F}_q$ . Recently, F. Luca and I. Shparlinski obtained upper bound on the number of  $q \leq Q$  which satisfy the above condition. We improve the Luca-Shparlinski bound (joint work with D. Baczkowski). (Received February 02, 2009)