On the symmetry of primes in almost all short intervals

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Abstract

In this paper we study the symmetry of primes in almost all short intervals; by elementary methods (based on the Large Sieve) we give, for $h \gg x^{1/3} \log^c x$ ($c > 0$, suitable), a non-trivial estimate for the mean-square (over $N < x \leq 2N$) of an average of "symmetry sums"; these sums control the symmetry of the von-Mangoldt function in short intervals around x. We explicitly remark that our results are out of reach of the classic analytic methods based on explicit formulas and complex integrals.