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CORRIGENDUM TO: ON THE EXCEPTIONAL SET OF HARDY-LITTLEWOOD'S NUMBERS IN SHORT INTERVALS

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Let $k \geq 2$ be an integer. In the paper [1] we proved a result on the set E_k of the integers which are neither a sum of a prime and a k-power nor a k-power of an integer. Setting $E_k(X) = E_k \cap [1, X]$ and $E_k(X, H) = E_k \cap [X, X+H]$, where X is a sufficiently large parameter and $H = o(X)$, our statement is

Theorem. *Let $k \geq 2$ be a fixed integer and $K = 2^{k-2}$. There exists a (small) positive absolute constant δ such that for $H \geq X^{7/12(1-1/k)+\delta}$*

$$|E_k(X, H)| \ll H^{1-\delta/(5K)}.$$

In fact our proof is not totally correct. There are two corrections to do. The first one is that the level Q of the the Farey dissection has to be fixed equal to $2kY^{1-1/k}$ instead of $4Y^{1-1/k}$ since, in the proof of Lemma 10 of [1], such a condition is needed to estimate, by using the first derivative method, the order of magnitude in a Farey arc of

$$F_k(\alpha) = \sum_{Y/4 \leq m^k \leq Y} e(m^k \alpha),$$

where $Y = X^{7/12+10\delta+\varepsilon}$ and $e(\alpha) = e^{2\pi i \alpha}$. We write here the corrected version of Lemma 10 of [1] whose proof is a slight modification of what Perelli-Zaccagnini [3], eq. (39)–(40), proved.

Lemma 10 of [1]. *Let $(a, q) = 1$, $Q \geq 2kY^{1-1/k}$ and $|\eta| \leq 1/qQ$. Then*

$$\left| F_k\left(\frac{a}{q} + \eta\right) \right| \ll \frac{Y^{1/k-1}}{|\eta|}.$$

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