Erratum: Average Values of Modular L-series Via the Relative Trace Formula

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The definition of the constant c_k (for $k \geq 2$) on page 702, 5th line from the bottom, should be replaced by the following:

$$c_k := 2^k d_k \frac{(k/2-1)!^2}{(k-1)!}$$

Here d_k is the formal degree of the holomorphic discrete series representation $\mathcal{D}_k$ of $\mathrm{PGL}(2,\mathbb{R})$, as normalized on page 702 of our paper. The statement of Theorem A on page 703 of the article is correct with this choice of the constant c_k. We thank David Whitehouse for pointing out this correction.

Here is an explanation of where and how the constant appears in the proof. On page 715, line 7, one finds an erroneous expression for $\Gamma\left(\frac{1+2r}{2}\right)$ as $\Gamma\left(\frac{1}{2}\right)(r-1)!$, which should have been $(r-1/2)(r-3/2)\dots(3/2)(1/2)\Gamma\left(\frac{1}{2}\right)$ instead. Consequently, the expression three lines later for $I_\infty(n^+, f_\infty; 0, 0)$ should be modified as follows (with $k = 2m$):

$$I_\infty(n^+, f_\infty; 0, 0) \;=\; 2^k d_k i \frac{\Gamma(k/2)^2}{\Gamma(k)^2} G(m),$$

where

$$G(m) := \sum_{n=0}^{m-1} \binom{2m}{2n+1} (-1)^{m-n} \Gamma(m-n-1/2)\Gamma(m+n+1/2).$$

An explicit calculation, using *Maple* for example, gives the identity

$$G(m) \;=\; -\pi\Gamma(2m).$$

It follows that

$$I_\infty(n^+, f_\infty; 0, 0) \;=\; -\pi i 2^k d_k \frac{\Gamma(k/2)^2}{\Gamma(k)}.$$

The rest of the paper is correct as it stands, and one gets Theorem A with the corrected constant c_k.