CORRECTION TO "DISCRETE FRACTIONAL RADON TRANSFORMS AND QUADRATIC FORMS," DUKE MATH. J. 161 (2012), 69–106

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This correction acknowledges an error that arose in the paper "Discrete fractional Radon transforms and quadratic forms" [1]. The error occurs in Section 5.2 in the treatment of an error term, and it affects the cases with dimension $k \geq 3$. When treating the Fourier multiplier supported on the major arcs corresponding to the remainder term in the theta function, we bound the Fourier coefficients of the multiplier on the line $\Re(\lambda) = -2/k$. The computation is correct until equation (83), but the summation over $s \leq j/2 - 10$ leads to a final bound in place of (83) of the form $|c_l(E_{\lambda,j}(\theta,\phi))| \leq A2^{j\alpha_k}$, where $\alpha_1 = 1$, $\alpha_2 = 1 + \epsilon$ for any $\epsilon > 0$, and $\alpha_k = 1/2 + k/4$ for $k \geq 3$. As a result, the bound on the line $\Re(\lambda) = -2/k$ that appears in Proposition 6 should instead read

$$\|\mathcal{E}_{\lambda,j} f\|_{\ell^\infty} \leq A2^{j\alpha_k} \|f\|_{\ell^1},$$

for α_k as defined above. As a consequence, for $k \geq 3$, the $(\ell^p, \ell^{p'})$ result of Proposition 6 holds in the more restricted range $k/(2k+2) < \lambda \leq 1$ rather than in the range $2/(k+4) < \lambda \leq 1$ as originally stated. (The conclusion of Proposition 6 is unchanged for $k = 1, 2$.) Similarly, since the proof of Proposition 7 calls upon (83), for $k \geq 3$ the conclusion of Proposition 7 also holds in the restricted range $k/(2k+2) < \lambda \leq 1$. (The conclusion of Proposition 7 is unchanged for $k = 1, 2$.) Correspondingly, the conclusion of Proposition 3 holds in the range $2/(k+4) < \lambda < 1$ for $k = 1, 2$ and the range $k/(2k+2) < \lambda < 1$ for $k \geq 3$. After interpolation, this leads to a corrected version of the main theorem, as follows.

THEOREM 1
Let $\lambda_k = 0$ if $k = 1, 2$, and let $\lambda_k = k/(2k+2)$ if $k \geq 3$. For any $k \geq 1$ and $\lambda_k < \lambda < 1$, the operator $J_{Q_1,Q_2,\lambda}$ extends to a bounded operator from $\ell^p(\mathbb{Z}^{k+1})$ to $\ell^q(\mathbb{Z}^{k+1})$ if and only if p, q satisfy
(i) $\quad 1/q \leq 1/p - k(1-\lambda)/(k+2)$,
(ii) $\quad 1/q < \lambda$, $1/p > 1 - \lambda$.

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