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CORRIGENDUM: ON CONVOLUTION OF BOAS TRANSFORM OF WAVELETS

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The paper [1] requires some clarifications. In Theorem 3.3 and Theorem 3.7, we assumed $G(x) = \int_{-1-x}^{1-x} \widehat{\psi^{(1)}}(\gamma)\, d\gamma$. This was incorrect. The correct value is given by $G(x) = \int_{-1}^{1} (1 - \frac{1}{|\gamma|})\, e^{-2\pi i\gamma x}\, \widehat{\psi_2^{(1)}}(-\gamma)\, d\gamma$. For clarity we give the statements of these two theorems and also first few corrected lines of the proof of Theorem 3.3.

Theorem 3.3. *Let ψ_1, ψ_2 be wavelets such that*

(i) $\psi_i, \hat{\psi}_i \in L^1(\mathbb{R})$ *for* $i = 1, 2$,

(ii) $\hat{\psi}_2(0) = 0$ *and* $\psi_2^{(1)} \in L^1(\mathbb{R})$, *and*

(iii) $\int_{\mathbb{R}} x^q G(x)\, dx = 0,$ *for* $0 \le q \le n$, *where* $G(x) = \int_{-1}^{1} (1 - \frac{1}{|\gamma|})\, e^{-2\pi i\gamma x}\, \widehat{\psi_2^{(1)}}(-\gamma)\, d\gamma$.

If ψ_1 and ψ_2 have m and n vanishing moments, respectively, then $\mathcal{B}\{\psi_1 * \psi_2\}$ has $(m+n)$ vanishing moments provided that $x^n\psi_2(x) \in L^2(\mathbb{R})$.

Proof. We have

$$\begin{aligned}\int_{\mathbb{R}} x^q\, \mathcal{B}\{\psi_1 * \psi_2\}(x)\, dx &= \sum_{p=0}^{q} {}^qC_p\, Mom_p(\psi_1) \Big(Mom_{q-p}(\mathcal{H}\psi_2) \\ &\qquad - \int_{\mathbb{R}} x^{q-p} \int_{\mathbb{R}} \mathcal{F}\{\mathcal{H}T_{-x}\psi_2\}(-\gamma)\, \hat{g}(\gamma)\, d\gamma\, dx \Big) \\ &= \sum_{p=0}^{q} {}^qC_p\, Mom_p(\psi_1) \Big(Mom_{q-p}(\mathcal{H}\psi_2) \\ &\qquad + i \int_{\mathbb{R}} x^{q-p} \int_{-1}^{1} \left(1 - \frac{1}{|\gamma|}\right) \mathcal{F}\{T_{-x}\psi_2^{(1)}\}(-\gamma)\, d\gamma\, dx \Big).\end{aligned}$$

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