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ERRATA: PRINCIPAL SERIES WHITTAKER FUNCTIONS ON $Sp(2;\boldsymbol{R})$, II

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This is the correction of our paper cited in the title.

Let $\pi(P_1; (\varepsilon, D_k^-); \nu_1 + \rho_{P_1})$ be a principal series representation of odd type considered in Proposition 2.1 (ii). The cause of mistake is that the corner K-type of this representation was wrongly specified; namely in the page 248, we should read "$\max(\lambda_2, k)$" as "λ_2" in the line 2 and "$\tau_{(l,l-1)}$ (resp. $\tau_{(l,-k-1)}$)" as "$\tau_{(l+1,l)}$ (resp. $\tau_{(l+1,-k)}$)" in the line 6.

On the second line in Section 7, $\tau_{(k+1,k)}$ should be replaced by $\tau_{(k,k-1)}$. Therefore the down shift operator $\mathcal{E}_k^{\text{down}}$ in Subsection 7.2 should read

$$\mathcal{E}_k^{\text{down}} : C^\infty_{\eta,(k,k-1)}(N\backslash G/K) \to C^\infty_{\eta,(k-1,k-2)}(N\backslash G/K)\,.$$

We have to replace the following Definition 7.2 by

$$c_i(a) = a_1^{k+2-i} a_2^{k-i} e^{-\sqrt{-1}\eta_{2e_2} a_2^2} h_i(a)\,, \quad i = 0, 1\,.$$

Then the functions h_i satisfy the following equations:

$$\text{(i)} \qquad \eta_{e_1-e_2} a_1^2 h_0(a) + \partial_1 h_1(a) = 0\,,$$

$$\text{(ii)} \qquad a_2^2 \partial_2 h_0(a) + \eta_{e_1-e_2} h_1(a) = 0\,,$$

$$\text{(iii)} \qquad \big((\partial_1+\partial_2)^2 + 2k(\partial_1+\partial_2) - 4\sqrt{-1}\eta_{2e_2} a_2^2 \partial_2\big) h_0(a) = (\nu_1^2 - k^2) h_0(a)\,,$$

$$\text{(iv)} \qquad \big((\partial_1+\partial_2)^2 + 2(k-2)(\partial_1+\partial_2) - 4\sqrt{-1}\eta_{2e_2} a_2^2 \partial_2\big) h_1(a) = \big(\nu_1^2 - (k-2)^2\big) h_1(a)\,.$$

From the equations (i) and (ii), we obtain

$$\left(\partial_1\partial_2 - \eta_{e_1-e_2}^2 \left(\frac{a_1}{a_2}\right)^2\right) h_i(a) = 0$$

for $i = 0, 1$. We introduce the integral transforms

$$h_i(a) = \int_{\boldsymbol{R}} \phi_i(u) \exp\left\{ c\left(\frac{u}{a_2^2} - \frac{\eta_{e_1-e_2}^2}{4u} a_1^2\right)\right\} \frac{du}{u}\,,$$

and put $\phi_0(u) = v^{-1/2-k}\psi_0(v)$ and $\phi_1(u) = v^{-1/2-k+2}\psi_1(v)$ with $v = \sqrt{u}$. Then we see that those satisfy

$$v^2 \frac{d^2\psi_i}{dv^2} + \left(\frac{1}{4} - \nu_1^2 - 8\sqrt{-1}\eta_{2e_2} v^2\right)\psi_i = 0$$

for $i = 0, 1$. After similar steps as in the original paper, we can revise the part (ii) of Theorem (8.2). It is enough to correct the last two formulae after this theorem. The right formulae for $c_0(a)$ and $c_1(a)$ are

$$\begin{aligned} c_0(a) =& C \times (-16\sqrt{-1}\eta_{e_1-e_2}\eta_{2e_2}) \times a_1^{k+2}a_2^k e^{-\sqrt{-1}\eta_{2e_2}a_2^2} \\ & \times \int_0^\infty t^{-1/2-k} W_{0,\nu_1}(t) \exp\left(-\frac{t^2}{32\sqrt{-1}\eta_{2e_2}a_2^2} + \frac{8\sqrt{-1}\eta_{e_1-e_2}^2\eta_{2e_2}a_1^2}{t^2}\right)\frac{dt}{t}\,, \\ c_1(a) =& C \times a_1^{k+1}a_2^{k-1}e^{-\sqrt{-1}\eta_{2e_2}a_2^2} \\ & \times \int_0^\infty t^{-1/2-k+2} W_{0,\nu_1}(t) \exp\left(-\frac{t^2}{32\sqrt{-1}\eta_{2e_2}a_2^2} + \frac{8\sqrt{-1}\eta_{e_1-e_2}^2\eta_{2e_2}a_1^2}{t^2}\right)\frac{dt}{t}\,. \end{aligned}$$

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