145. *On Some Results Involving Jacobi Polynomials and the Generalized Function* $\tilde{\omega}_{\mu_1,\cdots,\mu_n}(x)$. II

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4. **Particular cases.** In (3.1) and (3.2), taking $n=2$; we get

(4.1) $x^{\rho}\tilde{\omega}_{\mu_1,\mu_2}[\lambda x^{h/2}]$

$$=\frac{h^{-\beta-1}}{2\pi}\sum_{r=0}^{\infty}\frac{(\alpha+\beta+2r+1)\Gamma(\alpha+\beta+r+1)}{\Gamma(\alpha+r+1)}\sum_{i,-i}\frac{1}{i}G^{h+1,h+3}_{2h+5,2h+1}$$

$$\times\left(\frac{16e^{i\pi}}{\lambda^2}\left|\begin{matrix}\left(\frac{3}{4}-\frac{\mu_1}{2}\right),\ \frac{3}{4}-\frac{\mu_2}{2},\ \Delta(h,\rho-r+1),1,\\ \Delta(h,\rho+\alpha+1),1,\end{matrix}\right.\right.$$

$$\left.\begin{matrix}\frac{3}{4}+\frac{\mu_1}{2},\frac{3}{4}+\frac{\mu_2}{2},\ \Delta(h,\beta+\rho+\alpha+r+2)\\ \Delta(h,\rho+1)\end{matrix}\right)P_r^{(\alpha,\beta)}(1-2x),$$

where h is a positive number and $\tilde{\omega}_{\mu_1,\mu_2}(x)$ is a Watson's Fourier Kernal [1]. $R(\rho)\geq -1$.

(4.2) $x^{\rho}\tilde{\omega}_{\mu_1,\mu_2}[\lambda x^{-h/2}]$

$$=\frac{h^{-\beta-1}}{2\pi}\sum_{r=0}^{\infty}\frac{(\alpha+\beta+2r+1)\Gamma(\alpha+\beta+r+1)}{\Gamma(\alpha+r+1)}\sum_{i,-i}\frac{1}{i}G^{h+1,h+3}_{2h+5,2h+1}$$

$$\times\left(\frac{16e^{i\pi}}{\lambda^2}\left|\begin{matrix}\left(\frac{3}{4}-\frac{\mu_1}{2}\right),\frac{3}{4}-\frac{\mu_2}{2},\ \Delta(h,\alpha-\rho),1,\\ \Delta(h,r-\rho),1,\end{matrix}\right.\right.$$

$$\left.\begin{matrix}\frac{3}{4}+\frac{\mu_1}{2},\frac{3}{4}+\frac{\mu_2}{2},\Delta(h,\ -\rho)\\ \Delta(h,\ -\alpha-\beta-\rho-r-1)\end{matrix}\right)P_r^{(\alpha,\beta)}(1-2x),$$

where h is a positive number and $R(\rho)\geq -1$. Further setting $\mu_1=\mu_2-1=\mu$ in (4.1) and (4.2) will give the following results for Bessel functions.

(4.3) $x^{\rho}J_{2\mu+1}(2\lambda^{1/2}x^{h/4})$

$$=\frac{h^{-\beta-1}}{2\pi}\sum_{r=0}^{\infty}\frac{(\alpha+\beta+2r+1)\Gamma(\alpha+\beta+r+1)}{\Gamma(\alpha+r+1)}\sum_{i,-i}\frac{1}{i}G^{h+1,h+3}_{2h+5,2h+1}$$

$$\times\left(\frac{16e^{i\pi}}{\lambda^2}\left|\begin{matrix}\left(\frac{3}{4}-\frac{\mu}{2}\right),\frac{5}{4}-\frac{\mu}{2},\ \Delta(h,\rho-r+1),1,\\ \Delta(h,\rho+\alpha+1),1,\end{matrix}\right.\right.$$

$$\left.\begin{matrix}\frac{3}{4}+\frac{\mu}{2},\frac{1}{4}+\frac{\mu}{2},\ \Delta(h,\beta+\rho+\alpha+r+2)\\ \Delta(h,\rho+1)\end{matrix}\right)P_r^{(\alpha,\beta)}(1-2x),$$

where h is a positive number and $R(\rho)\geq -1$.