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ON SOME ASSOCIATED LEGENDRE-WRIGHT FUNCTIONS

Let us introduce the generalized associated Legendre-Wright functions in the following form:

$$P_{k,\lambda}^{m,n}(z) = \frac{1}{\Gamma(1-m)} \frac{(z+1)^{n/2}}{(z-1)^{m/2}} \times$$

$$\times R\Big(k - \frac{m-n}{2} + 1; -k - \frac{m-n}{2}; 1-m; \lambda; \frac{1-z}{2}\Big) =$$

$$\frac{(z+1)^{n/2}(z-1)^{-m/2}}{\Gamma(-k-\frac{m-n}{2})} \sum_{i=0}^{\infty} \frac{(k-\frac{m-n}{2}+1)\Gamma(-k-\frac{m-n}{2}+\lambda l)}{\Gamma(1-m+\lambda l) l!} \Big(\frac{1-z}{2}\Big)^l,$$

$$k-(m-n)/2 \neq -1, -2, \dots,\ k+(m+n)/2+\lambda$$

$$l \neq -1, -2, \dots,\ 2k+\lambda l \neq 1, 2, \dots,$$

$$|1-z| > 2,\ |\arg(z+1)| < \pi.$$

$$Q_{k,\lambda}^{m,n}(z) = e^{m\pi i} 2^{k-(m-n)/2} \frac{\Gamma\Big(k+\frac{m+n}{2}+1\Big)\Gamma\Big(k+\frac{m-n}{2}+1\Big)}{\Gamma(2k+2)} (z+1)^{n/2}$$

$$\times (z-1)^{-k-n/2-1} R\Big(k - \frac{m-n}{2} + 1; k + \frac{m+n}{2}; 2k+2; \lambda; \frac{2}{1-z}\Big) =$$

$$= e^{m\pi i} 2^{k-(m-n)/2} \Gamma\Big(k + \frac{m-n}{2} + 1\Big)(z+1)^{n/2}(z-1)^{-k-n/2-1} \times$$

$$\times \sum_{i=0}^{\infty} \frac{(k-\frac{m-n}{2}+1)_l \Gamma(k+\frac{m+n}{2}+\lambda l)}{\Gamma(2k+2+\lambda l) l!} \Big(\frac{2}{1-z}\Big)^l,$$

$$k-(m-n)/2 \neq -1, -2, \dots,\ k+(m+n)/2+\lambda$$

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$$|1-z| > 2,\ |\arg(z+1)| < \pi.$$

Some properties, integral representations, formula of Mehler-Dirichle type are given.