Errata and Comments to *Higher Transcendental Functions* and *Tables of Integral Transforms*

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These are comments and possibly not yet published errata to the volumes


**Higher transcendental functions, Vol. 1**

**2.5(16):** An equivalent summation formula can be found in the paper
M. Lerch, *Einiges über den Integrallogarithmus*, Monatsh. Math. Phys. 16 (1905), 125–134, see there formula (3) on p.129; however with a different proof than given here (I thank Michael Schlosser for this reference). Another equivalent form of the formula is:

\[
\sum_{k=0}^{n} \frac{(a)_k}{(c)_k} = \frac{\binom{-n,a,1}{-n,c;1}}{\frac{c-1}{c-a-1} \left(1-\frac{(a)_{n+1}}{(c-1)_{n+1}}\right)}.
\]

This is an indefinite sum which can also be found by Gosper’s algorithm.

**2.8(54):** On the left replace \(3a + 5/6\) (the third argument of \(F\)) by \(2a + 5/6\).

See the correct formula in [http://dlmf.nist.gov/15.4#iii](http://dlmf.nist.gov/15.4#iii), formula (15.4.32). For the proof and an observation of the error in Higher Transcendental Functions click there on the information on the right of the subsection header.

**2.10 (1)–(4):** The side condition for 2.10(1) and 2.10(4) should be:
\(|\arg z| < \pi, |\arg(1-z)| < \pi\).

The side condition for 2.10(2) and 2.10(3) should be \(|\arg(-z)| < \pi\).

**2.11(29):** Read \(z^2(2-z)^{-2}\) instead of \(z^2/(2-z)^{-2}\) (already in errata list in the volume).

**2.12(6):** The side condition on the parameters should be \(\text{Re } c > \text{Re } b > 0\).

**3.2(36), Remarks:** Instead of 2.11(17) better use 2.11(29) (after correction of that formula).

**3.4(8):** On the right, after the equality sign, replace \(i\pi\) by \(-i\pi\)
(observed by E. Diekema; see Ch. IV, (99) in L. Robin, *Fonctions sphériques de Legendre et fonctions sphérioidales*, Tome II, Gauthier-Villars, 1958).
after 3.5(3): For the convergence of both series require additionally that $\Re \mu < \frac{1}{2}$.

3.15(4): This formula is valid for $z \in \mathbb{C}\setminus(-\infty, 1]$. For $z \in (-1, 1)$ the formula remains valid if we replace $(z^2 - 1)^{\frac{1}{2} - \frac{1}{2} \nu}$ by $(1 - z^2)^{\frac{1}{2} - \frac{1}{2} \nu}$ and $P_{\nu}^{\frac{1}{2} - \nu} n^\nu - \frac{1}{2}$ by $P_{\nu}^{\frac{1}{2} - \nu} n^\nu - \frac{1}{2}$:

$$C_{n}^{\nu}(x) = 2^{\nu - \frac{1}{2}} \frac{\Gamma(n + 2 \nu) \Gamma(\nu + \frac{1}{2})}{\Gamma(2 \nu) \Gamma(n + 1)} (1 - x^2)^{\frac{1}{2} - \frac{1}{2} \nu} P_{n^\nu - \frac{1}{2}}^{\frac{1}{2} - \nu} (x) \quad (x \in (-1, 1)).$$

5.8(3): In the integrand the exponent of $(1 - u - v)$ should be $\gamma - \beta - \beta' - 1$.

Although the formula is given correctly in http://dlmf.nist.gov/16.15.E3, DLMF curiously refers there to Erdélyi et al. (1953a, §5.8) without observing the error in 5.8(3).

5.11(10): On the right the factor $(1 - y)^{-\mu}$ should be replaced by $(-y)^{-\mu}$.

6.15(15): The first factor $\Gamma(-a)$ in the integrand should be $\Gamma(a)$.

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10.9(6): The limit should be for $\lambda \to 0$ instead of $\lambda \to \infty$, and the equalities hold for $n = 1, 2, \ldots$.

Two lines below this formula sec. 10.10 should be sec. 10.11.

10.9(8): In the formula for $K_n$ insert a factor $n!$ on the right.

10.10(5): In the formula for $C_n$ delete the minus sign on the right.

10.11(16): But for $n = 0$ and $z_m = T_m$ we have $z_1(x) = xz_0(x)$.

10.12(2): The formula for $r_n$ should read: $r_n = -n(n + \alpha)$.

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1.10(5): On the left replace the expression for $f(x)$ $(0 < x < 1)$ by

$$(1 - x)^{\nu}(1 + x)^{\mu} P_{2n}^{(\nu, \mu)}(x) + (1 + x)^{\nu}(1 - x)^{\mu} P_{2n}^{(\mu, \nu)}(x).$$

1.10(6): On the left replace the expression for $f(x)$ $(0 < x < 1)$ by

$$(1 - x)^{\nu}(1 + x)^{\mu} P_{2n+1}^{(\nu, \mu)}(x) - (1 + x)^{\nu}(1 - x)^{\mu} P_{2n+1}^{(\mu, \nu)}(x).$$

On the right replace $(-1)^{n+1}$ by $(-1)^n$.

2.10(6): On the left replace the expression for $f(x)$ $(0 < x < 1)$ by

$$(1 - x)^{\nu}(1 + x)^{\mu} P_{2n}^{(\nu, \mu)}(x) - (1 + x)^{\nu}(1 - x)^{\mu} P_{2n}^{(\mu, \nu)}(x).$$

2.10(7): On the left replace the expression for $f(x)$ $(0 < x < 1)$ by

$$(1 - x)^{\nu}(1 + x)^{\mu} P_{2n+1}^{(\nu, \mu)}(x) + (1 + x)^{\nu}(1 - x)^{\mu} P_{2n+1}^{(\mu, \nu)}(x).$$

On the right replace $(-1)^{n+1}$ by $(-1)^n$.

3.3(4): On the left replace $P_n^{(\nu, \mu)}$ by $P_n^{(\nu, \mu)}$. 
This formula implies 1.10(5), 1.10(6), 2.10(6) and 2.10(7).

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20.2(6): On the right replace $(1 - z)^{\sigma}$ by $(1 - z)^{-\sigma}$.
This formula is correctly reproduced in Gradshteyn & Ryzhik, sixth ed., (7.512.9).