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

collected by Tom Koornwinder, `T.H.Koornwinder@uva.nl`

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

A. Erdélyi et al., *Higher transcendental functions, Vols. 1,2,3*, McGraw-Hill, 1953, 1953, 1955, and *Tables of integral transforms, Vols. 1,2*, McGraw-Hill, 1954, 1954.

See also the lists of errata which are included in the volumes, and the errata collected by H. van Haeringen and L. P. Kok in Math. Comp. 41 (1983), 778–780 at `http://www.jstor.org/stable/2007718`. Furthermore, see the i-boxes of the references to these volumes by A. Erdélyi et al. at `http://dlmf.nist.gov/bib/E`.

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:

$$\sum_{k=0}^{n}\frac{(a)_k}{(c)_k} = {}_3F_2\left(\begin{matrix}-n,a,1\\-n,c\end{matrix};1\right) = \frac{c-1}{c-a-1}\left(1-\frac{(a)_{n+1}}{(c-1)_{n+1}}\right).$$

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`, 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 $\mathrm{Re}\, c > \mathrm{Re}\, b > 0$.

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 sphéroidales, Tome II*, Gauthier-Villars, 1958).

after 3.5(3): For the convergence of both series require additionally that $\operatorname{Re}\mu < \frac{1}{2}$.

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

$$C_n^\nu(x) = 2^{\nu-\frac{1}{2}}\,\frac{\Gamma(n+2\nu)\,\Gamma(\nu+\frac{1}{2})}{\Gamma(2\nu)\,\Gamma(n+1)}\,(1-x^2)^{\frac{1}{4}-\frac{1}{2}\nu}\;\mathrm{P}^{\frac{1}{2}-\nu}_{n+\nu-\frac{1}{2}}(x) \qquad (x \in (-1,1)).$$

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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7.7(29): In the first constraint replace λ by ρ.

10.9(6): The limit should be for $\lambda \to 0$ insted 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: $r_n = -n(n+\alpha)$.

10.20(3): In the second line in the numerator of the fraction after the summation sign replace $\Gamma(2n+\alpha+\beta+1)$ by $(2n+\alpha+\beta+1)$.

§10.21: On p.219 (line after (8)) and p.220 (line before (14)) replace “(4)” by “(3)”.

§12.9, p.287, last formula: The last term on the left-hand side should be preceded by a plus sign rather than a minus sign.

12.9(9),(10): In these two formulas the last term on the left-hand side should be preceded by a plus sign rather than a minus sign.

Tables of integral transforms, Vol. 1

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 $(-1)^n$.

1.14(4): The formula is incorrect. See the corrected formula in a note by R. J. Mathar, `https://vixra.org/abs/2207.0148`, 2022, formula (8).

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 $P_n^{(\nu,\nu)}$ 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).

20.2(7): In the ${}_3F_2$ on the right replace the second lower parameter σ by $\sigma + \rho$ (error observed by M. L. Glasser, *Solution to Problem 85-19*, SIAM Review 28 (1986), 572–573)