

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

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 $\operatorname{Re} c > \operatorname{Re} b > 0$.

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 sphéroïdales, 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 $z \in \mathbb{C} \setminus (-\infty, 1]$. 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 $P_{n+\nu-\frac{1}{2}}^{\frac{1}{2}-\nu}$ by $P_{n+\nu-\frac{1}{2}}^{\frac{1}{2}-\nu}$:

$$C_n^\nu(x) = 2^{\nu-\frac{1}{2}} \frac{\Gamma(n+2\nu)\Gamma(\nu+\frac{1}{2})}{\Gamma(2\nu)\Gamma(n+1)} (1-x^2)^{\frac{1}{4}-\frac{1}{2}\nu} P_{n+\nu-\frac{1}{2}}^{\frac{1}{2}-\nu}(x) \quad (x \in (-1, 1)).$$

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

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

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 $(-1)^n$.

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)