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,
See also the lists of errata which are included in the volumes, and the errata collected
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:

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

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, 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 \( \Re c > \Re b > 0. \)

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

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 \( P_{\frac{n}{n+\nu-\frac{1}{2}}}^{\frac{1}{2} - \nu} \) by \( P_{\frac{n+\nu}{n+\nu-\frac{1}{2}}}^{\frac{1}{2} - \nu} \):

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

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 \( \lambda \) by \( \rho \).

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 \( z_1(x) = x z_0(x) \).

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 Gradshtein & Ryzhik, sixth ed., (7.512.9).

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