Errata for *Tables of Integrals, Series, and Products* (8^{th} edition)

by I. S. Gradshteyn and M. Ryzhik
edited by Daniel Zwillinger and Victor Moll
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NOTES

- The home page for this book is http://www.mathtable.com/gr
- The latest errata is available from http://www.mathtable.com/errata/
- The author can be reached at ZwillingerBooks@gmail.com
- This edition of the errata includes all the corrections (8+ pages!) in the paper: Dirk Veestraeten, *Some remarks, generalizations and misprints in the integrals in Gradshteyn and Ryzhik*, SCIENTIA, Series A: Mathematical Sciences, Vol. 26 (2015), pages 115–131.

ERRATA

1. New material to add

   (a) Add section 2.9 Other Elementary Functions

   (b) Add section 2.91 Minimum & Maximum

   2.91.1 $$\int \dots \int_{[a,b]^n} f(\min x_i, \max x_i)\, d\mathbf{x} = n(n-1) \int_a^b dv \int_a^v f(u,v)(v-u)^{n-2}\, du$$
   with the reference **MAR2007**

   2.91.2
   $$\int \dots \int_{[a,b]^n} f(\mathbf{x}, \min x_i, \max x_i)\, d\mathbf{x} = \sum_{\substack{j,k=1 \\ j\neq k}}^{n} \int_a^b dv \int_a^v du \int \dots \int_{[u,v]^{n-2}} f\left(\mathbf{x}, u, v \mid x_j = u, x_k = v\right) \prod_{i\in[n]\setminus\{j,k\}} dx_i$$
   with the reference **MAR2007**

   (c) Add section 2.92 Floor Function

   The floor of a number is the largest integer that is less than or equal to the number. For example $\lfloor 2.345 \rfloor = 2$ and $\lfloor 5 \rfloor = 5$.

2.92.1 $\underbrace{\int_0^1 \cdots \int_0^1}_{n} f\left(\lfloor x_1 + \cdots + x_n \rfloor\right)\, dx_1 \cdots dx_m = \sum_n \left\langle {n \atop k} \right\rangle \frac{f(k)}{n!}$ **GR1994, #6.65, p 316, 557**

where $\left\langle {n \atop k} \right\rangle$ are Eulerian numbers

(d) Add section 2.93 Fractional Part of Numbers

The fractional part of a number is defined as $\{x\} = x - \lfloor x \rfloor$. For example $\{2.345\} = 0.345$ and $\{5\} = 0$.

2.93.1 $\int_a^{a+n} \{x\}\, dx = \frac{n}{2} \qquad [a > 0, \quad n = 1, 2, 3, \dots]$ **FUR2013, 2.42**

2.93.2 $\int_0^1 \{kx\}\, dx = \frac{1}{2} \qquad [k = 1, 2, 3, \dots]$ **FUR2013, 2.28**

2.93.3 $\int_0^1 \{nx\}^k\, dx = \frac{1}{k+1} \qquad [k > -1, \quad n = 1, 2, 3, \dots]$ **FUR2013, 2.44**

2.93.4 $\int_0^1 (x - x^2)^k \{nx\}\, dx = \frac{(k!)^2}{2(2k+1)!} \qquad [k = 0, 1, 2, \dots, \quad n = 1, 2, 3, \dots]$ **FUR2013, 2.48**

2.93.5 $\int_1^\infty \frac{\{x\}}{x^2}\, dx = 1 - \boldsymbol{C}$

2.93.6 $\int_1^\infty \frac{\{x\}}{x^{k+1}}\, dx = \frac{1}{k-1} - \frac{\zeta(k)}{k} \qquad [k = 2, 3, 4, \dots]$ **FUR2013, 2.9**

2.93.7 $\int_1^\infty \frac{\{x\} - \frac{1}{2}}{x}\, dx = -1 + \log(\sqrt{2\pi})$

2.93.8 $\int_0^1 \left(\{ax\} - \frac{1}{2}\right)\left(\{bx\} - \frac{1}{2}\right) dx = \frac{1}{12ab} \qquad [\operatorname{Re} a > 0, \quad \operatorname{Re} b > 0]$

2.93.9 $\int_0^1 \left\{\frac{1}{x}\right\} dx = 1 - \boldsymbol{C}$

2.93.10 $\int_0^1 \left\{\frac{q}{x}\right\} dx = \begin{cases} q(1 - \boldsymbol{C} - \log q) & [0 < q \le 1] \\ q\left(1 + \frac{1}{2} + \cdots + \frac{1}{1+\lfloor q \rfloor} - \boldsymbol{C} - \log q + \frac{\lfloor q \rfloor(\{q\}-1)}{q(1+\lfloor q \rfloor)}\right) & [q > 1] \end{cases}$ **FUR2013, 2.5b**

2.93.11 $\int_0^1 x^m \left\{\frac{1}{x}\right\} dx = \frac{1}{m} - \frac{\zeta(m+1)}{m+1} \qquad [m > 0]$ **FUR2013, 2.20**

2.93.12 $\int_0^1 \frac{x}{1-x} \left\{\frac{1}{x}\right\} dx = \boldsymbol{C}$ **FUR2013, 2.15**

2.93.13 $\int_0^1 \left\{\frac{1}{x}\right\}^2 dx = \log(2\pi) - 1 - \boldsymbol{C}$

2.93.14 $\int_0^1 \left\{\frac{k}{x}\right\}^2 dx = k\left(\log(2\pi) - \boldsymbol{C} + 1 + \frac{1}{2} + \cdots + \frac{1}{k} + 2k\log k - 2k - 2\log k!\right) \qquad [k = 1, 2, 3, \dots]$ **FUR2013, 2.6**

2.93.15 $\int_0^1 \left\{\frac{1}{x}\right\}\left\{\frac{1}{1-x}\right\} dx = 2\boldsymbol{C} - 1$ **QIN2011**

2.93.16 $$\int_0^{1/2} \left\{\frac{1}{x}\right\} \left\{\frac{1}{1-x}\right\} dx = \int_{1/2}^1 \left\{\frac{1}{x}\right\} \left\{\frac{1}{1-x}\right\} dx = \boldsymbol{C} - \frac{1}{2}$$ **FUR2013, 2.10**

2.93.17 $$\int_0^1 \left\{\frac{1}{x}\right\}^2 \left\{\frac{1}{1-x}\right\} dx = \frac{5}{2} - \boldsymbol{C} - \log(2\pi)$$ **FUR2013, 2.12**

2.93.18 $$\int_0^1 \left\{\frac{1}{x}\right\}^2 \left\{\frac{1}{1-x}\right\}^2 dx = 4\log(2\pi) - 4\boldsymbol{C} - 5$$ **QIN2011**

2.93.19 $$\int_0^1 \left\{\frac{1}{x}\right\}^3 \left\{\frac{1}{1-x}\right\}^3 dx = 6\boldsymbol{C} + 2 - \zeta(2) - 3\log(2\pi) - \frac{18\zeta'(2)}{\pi^2}$$ **QIN2011**

2.93.20 $$\int_0^1 x^m \left\{\frac{1}{x}\right\}^m dx = 1 - \frac{\zeta(2)+\zeta(3)+\cdots+\zeta(m+1)}{m+1}$$
$[m = 1, 2, 3, \ldots]$ **FUR2013, 2.21**

2.94

2.94.1 $$\int_0^1 \left\{\frac{1}{\sqrt[k]{x}}\right\} dx = \frac{k}{k-1} - \zeta(k) \qquad [k = 2, 3, 4, \ldots]$$ **FUR2013, 2.7**

2.94.2 $$\int_0^1 \left\{\frac{k}{\sqrt[k]{x}}\right\} dx = \frac{k}{k-1} - k^k \left(\zeta(k) - \frac{1}{1^k} - \frac{1}{2^k} \cdots - \frac{1}{k^k}\right) \qquad [k = 2, 3, 4, \ldots]$$
FUR2013, 2.8

2.94.3 $$\int_0^1 \left\{\frac{1}{k\sqrt[k]{x}}\right\} dx = \frac{1}{k-1} - \frac{\zeta(k)}{k^k} \qquad [k = 2, 3, 4, \ldots]$$ **FUR2013, 2.9**

2.95 Combination of fractional part and other functions

2.95.1 $$\int_0^1 \left\{(-1)^{\lfloor \frac{1}{x} \rfloor} \frac{1}{x}\right\} dx = 1 + \log\frac{2}{\pi}$$ **FUR2013, 2.13**

2.95.2 $$\int_0^1 x \left\{\frac{1}{x}\right\} \left\lfloor\frac{1}{x}\right\rfloor dx = \frac{\pi^2}{12} - \frac{1}{2}$$ **FUR2013, 2.14a**

2.95.3 $$\int_0^1 \{\log x\}\, x^m\, dx = \frac{e^{m+1}}{(m+1)(e^{m+1}-1)} - \frac{1}{(m+1)^2} \qquad [m > -1]$$ **FUR2013, 2.16**

2.96 Multiple integrals

2.96.1 $$\int_0^1 \int_0^1 \left\{k\frac{x}{y}\right\} dx\, dy = \frac{k}{2}\left(1 + \frac{1}{2} + \cdots + \frac{1}{k} - \log k - \boldsymbol{C}\right) + \frac{1}{4}$$
$[k = 1, 2, 3, \ldots]$ **FUR2013, 2.28**

2.96.2 $$\int_0^1 \int_0^1 \left\{\frac{mx}{ny}\right\} dx\, dy = \frac{m}{2n}\left(\log\frac{n}{m} + \frac{3}{2} - \boldsymbol{C}\right)$$
[m and n are integers with $m \le n$] **FUR2013, 2.29**

2.96.3 $$\int_0^1 \int_0^1 \left\{\frac{x^k}{y}\right\} dx\, dy = \frac{2k+1}{(k+1)^2} - \frac{\boldsymbol{C}}{k+1} \qquad [k \ge 0]$$ **FUR2013, 2.30**

2.96.4 $$\int_0^1 \int_0^1 \left\{\frac{x}{y}\right\} \left(\frac{y}{x}\right)^k dx\, dy = 1 - \frac{\zeta(2)+\zeta(3)+\cdots+\zeta(k+1)}{2(k+1)}$$
$[k = 1, 2, 3, \ldots]$ **FUR2013, 2.33**

2.96.5 $$\int_0^1 \int_0^1 \left\{\frac{x}{y}\right\} \frac{y^k}{x^p}\, dx\, dy = \frac{1}{k-p+1} - \frac{\zeta(2)+\zeta(3)+\cdots+\zeta(k+1)}{(k+2-p)(k+1)}$$
[k is an integer, p is real, $k - p > -1$] **FUR2013, 2.34**

2.96.6 $\int_0^1 \int_0^1 \left\{\frac{x}{y}\right\} \left\{\frac{y}{x}\right\} \, dx \, dy = 1 - \frac{\pi^2}{12}$ **FUR2013,2.36**

2.96.7 $\int_0^1 \int_0^1 \left\{\frac{x}{y}\right\}^2 \, dx \, dy = \frac{\log(2\pi)}{2} - \frac{1}{3} - \frac{\boldsymbol{C}}{2}$ **FUR2013, 2.31**

2.96.8 $\int_0^1 \int_0^1 x^m y^n \left\{\frac{x}{y}\right\} \left\{\frac{y}{x}\right\} \, dx \, dy = \frac{1}{m+n+1} \left(\frac{1}{n+1} + \frac{1}{m+1} - \frac{\zeta(n+2)}{n+2} - \frac{\zeta(m+2)}{m+2} \right)$ $[m > -1, \quad n > -1]$ **FUR2013, 2.37**

2.96.9 $\int_0^1 \int_0^1 (xy)^n \left\{\frac{x}{y}\right\} \left\{\frac{y}{x}\right\} \, dx \, dy = \frac{1}{(n+1)^2} - \frac{\zeta(n+1)}{(n+1)(n+2)}$ $[n > -1]$ **FUR2013, 2.38**

2.96.10 $\int_0^1 \int_0^1 \left\{\frac{x}{y}\right\}^m \left\{\frac{y}{x}\right\}^m \, dx \, dy = 1 - \frac{\zeta(2) + \zeta(3) + \cdots + \zeta(m+1)}{m+1}$ $[m = 1, 2, 3, \ldots]$ **FUR2013, 2.40**

2.96.11 $\int_0^1 \int_0^1 \left\{\frac{2x}{y}\right\} \left\{\frac{2y}{x}\right\} \, dx \, dy = \frac{49}{6} - \frac{2\pi^2}{3} - 2 \log 2$ **FUR2013, 2.39**

2.96.12 $\int_0^1 \int_0^1 \left\{\frac{x-y}{x+y}\right\} \, dx \, dy = \int_0^1 \int_0^1 \left\{\frac{x+y}{x-y}\right\} \, dx \, dy = \frac{1}{2}$ **FUR2013, 2.51**

2.96.13 $\int_0^1 \int_0^1 \left\{\frac{k}{x-y}\right\} \left\{\frac{1}{x}\right\} \left\{\frac{1}{y}\right\} \, dx \, dy = \frac{1}{2}(1 - \boldsymbol{C})^2 \qquad [k > 0]$ **FUR2013, 2.52**

2.96.14 $\int_0^1 \int_0^1 x \left\{\frac{1}{1-xy}\right\} \, dx \, dy = 1 - \frac{\zeta(2)}{2} = 1 - \frac{\pi^2}{12}$ **FUR2013, 2.23**

2.96.15 $\int_0^1 \int_0^1 \left\{\frac{1}{x+y}\right\}^m \, dx \, dy = \begin{cases} 2 \log 2 - \frac{\pi^2}{12} & m = 1 \\ \frac{5}{2} - \log 2 - \boldsymbol{C} - \frac{\pi^2}{12} & m = 2 \end{cases}$ **FUR2013, 2.24**

2.96.16 $\int\int_{0 \le x,y \le 1} \left\{\frac{1}{x+y}\right\}^m \, dx \, dy = \begin{cases} 2 \log 2 - \frac{\pi^2}{12} & m = 1 \\ \frac{3}{2} - \frac{\pi^2}{12} - \log 2 - \boldsymbol{C} & m = 2 \end{cases}$ **QIN2011, 3.1**

2.96.17 $\int\int\int_{0 \le x,y,z \le 1} \left\{\frac{1}{x+y+z}\right\}^m \, dx \, dy \, dz = \begin{cases} \frac{9}{2} \log 3 - \frac{13}{24} - \frac{19}{4} \log 2 - \frac{\zeta(3)}{3} & m = 1 \\ \frac{53}{24} + 4 \log 2 - 3 \log 3 - \frac{\zeta(3)}{3} - \frac{\pi^2}{12} & m = 2 \end{cases}$ **QIN2011, 3.2**

2.96.18 $\int_0^{a_1} \cdots \int_0^{a_n} \{k(x_1 + x_2 + \cdots + x_n)\} \, dx_n \, \cdots \, dx_1 = \frac{1}{2} a_1 a_2 \cdots a_n$ **FUR2013, 2.42b**

(e) Add the following integral on page 572

4.318.3 $\int_0^1 \frac{\log[(1+x^a)(1+x^{1/a})]}{1+x} dx = (\log 2)^2 \qquad [a > 0]$

(f) Add section 5.6 Lambert W-function

5.6.1 $\int \mathrm{W}(x) \, dx = x \, \mathrm{W}(x) - x + e^{\mathrm{W}(x)}$

5.6.2 $\int x \, \mathrm{W}(x) \, dx = \frac{1}{2} \left(\mathrm{W}(x) - \frac{1}{2}\right) \left(\mathrm{W}^2(x) + \frac{1}{2}\right) e^{2\,\mathrm{W}(x)}$

5.6.3 $\int x \sin\left(\mathrm{W}(x)\right) \, dx = \frac{1}{2} \left(x + \frac{x}{\mathrm{W}(x)} \right) \sin\left(\mathrm{W}(x)\right) - \frac{x}{2} \cos\left(\mathrm{W}(x)\right)$

(g) Add the following extra cases to the existing integrals on page 738

6.699.1 $\text{integral} = \dfrac{2^{\nu-1}\Gamma\left(-\frac{1}{2}-\lambda\right)\Gamma\left(\frac{3}{2}+\frac{1}{2}\lambda+\frac{1}{2}\nu\right)}{a^{\lambda+1}\Gamma\left(\nu-\lambda\right)\Gamma\left(\frac{1}{2}-\frac{1}{2}\lambda-\frac{1}{2}\nu\right)}$

$[b=a, \quad a>0, \quad -1<\operatorname{Re}\nu<\operatorname{Re}(1+\lambda)<\frac{1}{2}]$ **ET 1 6.8(10)**

6.699.2 $\text{integral} = \dfrac{2^{\nu-1}\Gamma\left(-\frac{1}{2}-\lambda\right)\Gamma\left(1+\frac{1}{2}\lambda+\frac{1}{2}\nu\right)}{a^{\lambda+1}\Gamma\left(\frac{1}{2}\lambda-\frac{1}{2}\nu\right)\Gamma\left(\nu-\lambda\right)}$

$[b=a, \quad a>0, \quad -\operatorname{Re}\nu<\operatorname{Re}(1+\lambda)<\frac{1}{2}]$ **ET 1 6.8(11)**

(Thanks to Shenhui Liu for suggesting the inclusion of these evaluations.)

(h) Add section 7.9 Lambert W-function

7.9.1 $\displaystyle\int_0^\infty \mathrm{W}(x)x^{-3/2}\,dx = \sqrt{8\pi}$

7.9.2 $\displaystyle\int_0^e \mathrm{W}(x)\,dx = e-1$

7.9.3 $\displaystyle\int_0^e \frac{x}{\mathrm{W}(x)}dx = \frac{3e^2}{4}$

(i) Add section 8.5181 The series $\sum J_{k+\nu}(x)J_{k+\mu}(x)$

8.5181.1 $\displaystyle\sum_{k=0}^{\infty} J_{k+\nu}(x)J_{k+\mu}(x) = K(\mu,\nu)$ [μ and ν are real]

$$K(\mu,\nu) = \frac{(x/2)^{\mu+\nu}}{\Gamma(\mu+1)\Gamma(\nu+1)}\,{}_2F_3\left[\frac{\mu+\nu}{2},\frac{\mu+\nu+1}{2};\mu+1,\nu+1,\mu+\nu;-x^2\right]$$

8.5181.2 $\displaystyle\sum_{k=L}^{M} J_{k+\nu}(x)J_{k+\mu}(x) = K(\mu+L,\nu+L)-K(\mu+M+1,\nu+M+1)$

8.5181.3 $\displaystyle\sum_{k=0}^{\infty} J_k(x)J_{k+\mu}(x) = \frac{x}{2\mu}\left[J_0(x)J_{\mu-1}(x)+J_1(x)J_\mu(x)\right]$ [μ is real]

8.5181.4 $\displaystyle\sum_{k=0}^{\infty} J_k(x)J_{k+1}(x) = \frac{x}{2}\left[J_0^2(x)+J_1^2(x)\right]$

8.5181.5 $\displaystyle\sum_{k=0}^{\infty} J_k(x)J_{k+2}(x) = \frac{x}{4}\left[J_0(x)J_1(x)+J_1(x)J_2(x)\right] = \frac{1}{2}J_1^2(x)$

8.5181.6 $\displaystyle\sum_{k=0}^{\infty} J_k(x)J_{k+3}(x) = \frac{x}{6}\left[J_0(x)J_2(x)+J_1(x)J_3(x)\right]$

(Thanks to David A. Kessler for suggesting the inclusion of these sums.)

(j) Add the following references on pages 1105–1108:

- **AR** Juan Arias De Reyna, *True Value of an Integral in Gradshteyn and Ryzhiks Table*, 29 Jan 2018, `https://arxiv.org/pdf/1801.09640.pdf`
- **FUR2013** Ovidiu Furdui, *Limits, Series, and Fractional Part Integrals: Problems in Mathematical Analysis*, Springer, 2013
- **GR1994** Ronald L. Graham, Donald E. Knuth, and Oren Patashnik, *Concrete Mathematics*, Second Edition, 1994, `https://www.csie.ntu.edu.tw/~r97002/temp/Concrete%20Mathematics%202e.pdf`
- **MAR2007** Jean-Luc Marichal, *Multivariate integration of functions depending explicitly on the minimum and the maximum of the variables*, 13 Oct 2007, `https://arxiv.org/abs/0710.2614`
- **QIN2011** Huizeng Qin and Youmin Lu, "Integrals of Fractional Parts and Some New Identities on Bernoulli Numbers", *Int. J. Contemp. Math. Sciences*, Vol. 6, 2011, no. 15, 745–761, `http://m-hikari.com/ijcms-2011/13-16-2011/luyouminIJCMS13-16-2011.pdf`
- **VE2015** Dirk Veestraeten, *Some remarks, generalizations and misprints in the integrals in Gradshteyn and Ryzhik*, SCIENTIA, Series A: Mathematical Sciences, Vol. 26 (2015), pages 115–131.

2. **Acknowledgements** on pages xix–xxiii. Add the following names:

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- Dr. Travis Porco
- Dr. Martin Venker
- Dr. Michal Wierzbicki
- Dr. Shotaro Yamazoe
- Dr. Junggi Yoon

Also, the name "Dr. M. A. F. Sanjun" is incorrect; it should be "Dr. Miguel A. F. Sanjuan".

3. Page 32, Formula 1.323.6: replace "cosh" with "cos"

   (Thanks to Farid Bouttout for correcting this error.)

4. Page 71, Integral 2.124: The first evaluation is incorrect; replace $x\sqrt{\dfrac{ab}{a}}$ with $x\sqrt{\dfrac{b}{a}}$.

   (Thanks to Leland Langston for correcting this error.)

5. Page 79, Integral 2.172: The evaluation is improved by replacing $\left(\dfrac{b+2cx}{\sqrt{-\Delta}}\right)$ with $\left(\dfrac{\sqrt{-\Delta}}{b+2cx}\right)$ for the case $\Delta < 0$. Since $\operatorname{arctanh} z$ is equal to $\operatorname{arctanh} \frac{1}{z}$ plus a constant, the evaluation is structually the same. However, complex constants are avoided since the arctanh argument does not exceed one.

   (Thanks to Leland Langston for this improvement.)

6. Page 109, Integral 2.33.16: replace 'exp" with "erf".

   (Thanks to Aaron Hendrickson for correcting this error.)

7. Page 184, line 7: Disregard the spurious text "ndexsquare roots"

8. Page 184, integral 2.581 1

   To correct this integral, in the first line of the evaluation change
   $[m+n-2(m+r-1)k^2]$ to
   $[(m+n-2)+(m+r-1)k^2]$.

   (Thanks to Peng Zhang for correcting this error.)

9. Page 224, Integral 2.647.6: replace "$\frac{\pi}{2}$" with "$\frac{x}{2}$".

10. Page 326, Integral 3.248.5

    When integral 3.248.5 in the 6th edition was found to be incorrect the entry was removed; neither the 7th or 8th edition had an entry for 3.248.5. The correct evalaution was determined in the paper **AR**.

    The integral (6th edition, page 321) is

$$\int_0^\infty \frac{dx}{(1+x^2)^{3/2}} \frac{1}{\sqrt{\phi(x)+\sqrt{\phi(x)}}} = \frac{\pi}{2\sqrt{6}} \qquad \mathbf{X}$$

    which is incorrect. It should have been

$$\int_0^\infty \frac{dx}{(1+x^2)^{3/2}} \frac{1}{\sqrt{\phi(x)+\sqrt{\phi(x)}}} = \frac{\sqrt{3}-1}{\sqrt{2}} \Pi\left(\frac{\pi}{2}, k, 3^{-1/2}\right) - \frac{1}{\sqrt{2}} F\left(\alpha, 3^{-1/2}\right)$$

    with $\phi(x) = 1 + \frac{4}{3}\left(\frac{x}{1+x^2}\right)^2$, $k = 2-\sqrt{3}$, and $\alpha = \arcsin\sqrt{k}$ and the reference **AR**.

11. Page 326, add new Integral 3.248.5(1)

    In the search for the correct evaluation of 3.248.5 (see note above), a small variation of the integral was found (in an unpublished paper by Juan Arias de Reyna, Petr Blaschke, and Victor H. Moll). This, perhaps, explains the original typographic error in 3.248.5.

$$\int_0^\infty \frac{dx}{(1+x^2)^{3/2}} \frac{1}{\sqrt{\phi(x)+\sqrt{\phi(x)^3}}} = \frac{\pi}{2\sqrt{6}}$$

    with $\phi(x) = 1 + \frac{4}{3}\left(\frac{x}{1+x^2}\right)^2$.

12. Page 329, Integral 3.252.11: replace (β^2-1) with $(1-\beta^2)$.

13. Page 336, Integral 3.311.1: add the constraint $\operatorname{Re} p > 0$; add reference **VE2015**

14. Page 336, Integral 3.311.5: replace $\operatorname{Re}\nu < 1$ with $\operatorname{Re}\nu < 0$; add reference **VE2015**

15. Page 337, Integral 3.312.1: replace $\operatorname{Re}\nu > 0$ with $\operatorname{Re}\nu > 1$; add reference **VE2015**

16. Page 338, Integral 3.318.2: change $\sqrt{\pi e^{\cdots}}$ with $\sqrt{\pi}e^{\cdots}$; add reference **VE2015**

17. Page 338, Integral 3.321.3: replace $\dfrac{\sqrt{\pi}}{2q}$ $[q > 0]$ with $\dfrac{\sqrt{\pi}}{2\sqrt{q^2}}$ $[\operatorname{Re} q^2 > 0]$; add reference **VE2015**

18. Page 339, Integral 3.322.1: remove $\operatorname{Re}\beta > 0, \quad u > 0$; add reference **VE2015**

19. Page 339, Integral 3.323.2: replace $\dfrac{\sqrt{\pi}}{p}$ with $\dfrac{\sqrt{\pi}}{\sqrt{p^2}}$; add reference **VE2015**

20. Page 339, Integral 3.323.3: add the constraint $[\operatorname{Re} a > 0]$; add reference **VE2015**

21. Page 339, Integral 3.323.4: add the constraint $[\operatorname{Re}\beta^2 > 0, \quad \operatorname{Re}\gamma^2 > 0]$; add reference **VE2015**

22. Page 344, Integral 3.354.5: replace $\dfrac{\pi}{a}$ with $\dfrac{\pi}{|a|}$; add reference **VE2015**

23. Page 350, Integral 3.383.5

    The evaluation of the integral is incorrect. The correct evaluation is

$$= \frac{\pi^2}{p^q\,\Gamma(\nu)\,\sin[\pi(q-\nu)]}\left[\left(\frac{p}{a}\right)^{\nu}\frac{L_{-\nu}^{\nu-q}\left(\frac{p}{a}\right)}{\sin(\pi\nu)\,\Gamma(1-q)} - \left(\frac{p}{a}\right)^{q}\frac{L_{-q}^{q-\nu}\left(\frac{p}{a}\right)}{\sin(\pi q)\,\Gamma(1-\nu)}\right]$$

    (Thanks to Mohammad S. Alhassoun for correcting this error.)

24. Page 351, Integral 3.385

    (a) The evaluation of the integral is incorrect; the term
    $\Phi_1(\nu, \varrho, \lambda+\nu, -\mu, b)$ should be
    $\Phi_1(\nu, \varrho, \lambda+\nu, b, -\mu)$

    (b) The reference is incorrect. It is now "ET 1 39(24)", it should be "ET 1 139(24)".

    (Thanks to Travis Porco for correcting these errors.)

25. Page 358, Integral 3.416.3: replace 2^{2^n} with 2^{2n}; add reference **VE2015**

26. Page 358, Integral 3.417.1: replace $\dfrac{\pi}{2ab}\ln\left(\dfrac{b}{a}\right)$ $[ab > 0]$ with $\dfrac{\pi}{2|ab|}\ln\left(\left|\dfrac{b}{a}\right|\right)$ $[a \neq 0, \quad b \neq 0]$; add reference **VE2015**

27. Page 361, Integral 3.426.2

    The numerator of the integrand is incorrect; the term "$(e^x - ae^{-x})$" should be "$(e^x + ae^{-x})$".

28. Page 369, Integral 3.462.22: replace "$K_1(ab)$" with "$K_2(ab)$".

    (Thanks to Peter Brown for correcting this error.)

29. Page 369, Integral 3.462.25: replace $\operatorname{Re} b > 0$ with $\operatorname{Re} p > 0$; add reference **VE2015**

30. Page 369, Integral 3.466.1: expand the evalution with

$$[1-\Phi(b\mu)]\,\frac{\pi}{2b}e^{b^2\mu^2} \qquad [\operatorname{Re} b > 0, \quad |\arg\mu| < \tfrac{\pi}{4}]$$
$$-\,[1+\Phi(b\mu)]\,\frac{\pi}{2b}e^{b^2\mu^2} \qquad [\operatorname{Re} b < 0, \quad |\arg\mu| < \tfrac{\pi}{4}]$$

and add reference **VE2015**

31. Page 374, Integral 3.512.2

 (a) Replace $\frac{1}{2}\,\mathrm{B}\left(\frac{\mu+1}{2}, \frac{\nu-\boxed{1}}{2}\right)$ with $\frac{1}{2}\,\mathrm{B}\left(\frac{\mu+1}{2}, \frac{\nu-\mu}{2}\right)$

 (b) Replace the constraints with $[\operatorname{Re}(\nu) > \operatorname{Re}(\mu) > -1]$

 (Thanks to Shotaro Yamazoe for correcting this error.)

32. Page 382, Integral 3.527.13 : in the denominator of the integrand replace "$\cosh^2 x$" with "$\sinh^2 x$".

33. Page 419, Integral 3.691.2: replace $S\left(\sqrt{a}\right)$ with $S\left(\sqrt{\frac{2a}{\pi}}\right)$; add reference **VE2015**

34. Page 419, Integral 3.691.3: replace $C\left(\sqrt{a}\right)$ with $C\left(\sqrt{\frac{2a}{\pi}}\right)$; add reference **VE2015**

35. Page 419, for Integrals 3.691.4, 3.691.6, 3.691.8, and 3.691.9: replace $C\left(\frac{b}{\sqrt{a}}\right)$ with $C\left(b\sqrt{\frac{2}{a\pi}}\right)$ and replace $S\left(\frac{b}{\sqrt{a}}\right)$ with $S\left(b\sqrt{\frac{2}{a\pi}}\right)$; add reference **VE2015**

36. Page 429, Integral 3.725.3: the evalution of the integral should be changed to the following

$$\begin{array}{rll}
\gamma_1 & [\operatorname{Re}\beta > 0, & 0 < a < b] \\
\gamma_1 & [\operatorname{Re}\beta > 0, & a < 0 < b] \\
-\gamma_1 & [\operatorname{Re}\beta < 0, & b < a < 0] \\
\gamma_2 & [\operatorname{Re}\beta < 0, & 0 < a < b] \\
\gamma_2 & [\operatorname{Re}\beta < 0, & a < 0 < b] \\
-\gamma_2 & [\operatorname{Re}\beta > 0, & b < a < 0] \\
\gamma_3 & [\operatorname{Re}\beta > 0, & 0 < b < a] \\
\gamma_3 & [\operatorname{Re}\beta > 0, & b < 0 < a] \\
-\gamma_3 & [\operatorname{Re}\beta < 0, & a < b < 0] \\
\gamma_4 & [\operatorname{Re}\beta < 0, & 0 < b < a] \\
\gamma_4 & [\operatorname{Re}\beta < 0, & b < 0 < a] \\
-\gamma_4 & [\operatorname{Re}\beta > 0, & a < b < 0]
\end{array}$$

where

$$\begin{aligned}
\gamma_1 &= \frac{\pi}{2\beta^2} e^{-b\beta} \sinh(a\beta) \\
\gamma_2 &= -\frac{\pi}{2\beta^2} e^{b\beta} \sinh(a\beta) \\
\gamma_3 &= -\frac{\pi}{2\beta^2} e^{-a\beta} \cosh(b\beta) + \frac{\pi}{2\beta^2} \\
\gamma_4 &= -\frac{\pi}{2\beta^2} e^{a\beta} \cosh(b\beta) + \frac{\pi}{2\beta^2}
\end{aligned}$$

and add reference **VE2015**

37. Page 439, Integral 3.755.1: add the constraint $\operatorname{Re} b > 0$; add reference **VE2015**

38. Page 447, Integral 3.772.5: replace "ET I 12(4)" with "read ET I 12(14)"; add reference **VE2015**

39. Page 489, Integrals 3.891.1 and 3.891.2.

    In each case the results are correct, but only when m and n are non-negative integers. The result when m and n can be any integers are:

$$3.891.1 \quad \int_0^{2\pi} e^{imx} \sin nx\, dx = \begin{cases} 0 & |m| \neq |n| \text{ or } m = n = 0 \\ \pi i & m = n \neq 0 \\ -\pi i & m = -n \neq 0 \end{cases}$$

$$3.891.2 \quad \int_0^{2\pi} e^{imx} \cos nx\, dx = \begin{cases} 0 & |m| \neq |n| \text{ or } m = n = 0 \\ \pi i & |m| = n \neq 0 \\ 2\pi i & m = n = 0 \end{cases}$$

(Thanks to Guillem Blanco for correcting these errors.)

40. Page 535, Integral 4.224.12: remove the evaluation for $a^2 \geq 1$; remove the reference

    (Thanks to Martin Kreh and Richard Hunt for correcting these errors.)

41. Page 535, Integral 4.224.12 (1)

    The integrand has the exponent of "2" in the wrong place. The evaluation is correct. That is, replace the current entry with

$$\int_0^\pi \ln\left(1 + a\cos x\right)^2\, dx = \begin{cases} 2\pi \ln\left(\dfrac{1+\sqrt{1-a^2}}{2}\right) & \text{for } a^2 \leq 1 \\ 2\pi \ln\left(\dfrac{|a|}{2}\right) & \text{for } a^2 \geq 1 \end{cases}$$

    And add the reference "BI (330)(1)".

    (Thanks to Martin Kreh and Richard Hunt for correcting these errors.)

42. Page 535, Integral 4.225.4: replace the reference with "BI (332)(3)"

    (Thanks to Richard Hunt for correcting this error.)

43. Page 539, Integral 4.231 19

    The correct evaluation of this integral is (the "2" should be a "12")

$$\int_0^1 \frac{x \log x}{1+x}\, dx = -1 + \frac{\pi^2}{12}$$

    (Thanks to Kendall Richards for correcting this error.)

44. Page 580, Integral 4.358.2: replace $\zeta(2, \nu - 1)$ with $\zeta(2, \nu)$; add reference **VE2015**

45. Page 654, Integral 6.282.2: add the constraint $\operatorname{Re}\mu > 0$; add reference **VE2015**

46. Page 654, Integral 6.283.1: replace "$\operatorname{Re}\alpha > 0$" with "$\operatorname{Re}\beta < 0$"; add reference **VE2015**

47. Page 654, Integral 6.285.1: expand the evalution by replacing

$$\frac{\arctan\mu}{\sqrt{\pi}}\mu \qquad [\operatorname{Re}\mu > 0]$$

    with

$$\frac{\arctan\sqrt{\mu^2}}{\sqrt{\pi}\sqrt{\mu^2}} \qquad [\operatorname{Re}\mu^2 > 0]$$

    Add the reference **VE2015**

48. Page 654, Integral 6.285.2: change sign of result by replacing $-\dfrac{1}{2ai\sqrt{\pi}}$ with $\dfrac{1}{2ai\sqrt{\pi}}$; add reference **VE2015**

49. Page 655, Integral 6.291: replace $\frac{\mu}{a}$ with $\frac{\mu}{4}$; add reference **VE2015**

50. Page 655, Integral 6.295.2: replace $-\frac{1}{\mu^2}$ with $-\frac{1}{\mu}$; add reference **VE2015**

51. Page 656, Integral 6.296: replace "$a > 0$" with "a real"; add reference **VE2015**

52. Page 656, Integral 6.297.1: add the constraint $\mathrm{Re}(\gamma^2 - \mu) < 0$; add reference **VE2015**

53. Page 656, Integral 6.297.2: replace "$a > 0, b > 0, \mathrm{Re}\,\mu > 0$" with "$b > 0, \mathrm{Re}(\mu^2 - a^2) > 0$"; add reference **VE2015**

54. Page 656, Integral 6.297.3: remove $a > 0$; add reference **VE2015**

55. Page 656, Integral 6.298: replace the constraint with "$[b > 0, \quad \mathrm{Re}\,\mu > 0, \quad \mathrm{Re}(\mu - a^2) > 0]$"; add reference **VE2015**

56. Page 656, Integral 6.299: replace $K_\nu(a^2)$ with $K_\nu(\frac{1}{2}a^2)$; add reference **VE2015**

57. Page 656, Integral 6.311: generalize the evaluation to be

$$\begin{array}{ll} \frac{1}{b}\left(1 - e^{-b^2/4a^2}\right) & [a > 0, \quad b \neq 0] \\ \frac{1}{b}\left(1 + e^{-b^2/4a^2}\right) & [a < 0, \quad b \neq 0] \end{array}$$

and add reference **VE2015**

58. Page 656, Integral 6.312: expand the evalution, and correct the constraint, with

$$\begin{array}{ll} \frac{1}{4\sqrt{2\pi b}}\left[\ln\left(\frac{b+a^2+a\sqrt{2b}}{b+a^2-a\sqrt{2b}}\right) + 2\arctan\left(\frac{a\sqrt{2b}}{b-a^2}\right)\right] & [a > 0, \quad b > 0, \quad a < \sqrt{b}] \\ \frac{1}{4\sqrt{2\pi b}}\left[\ln\left(\frac{b+a^2+a\sqrt{2b}}{b+a^2-a\sqrt{2b}}\right) + 2\arctan\left(\frac{a\sqrt{2b}}{b-a^2}\right) + 2\pi\right] & [a > 0, \quad b > 0, \quad a > \sqrt{b}] \end{array}$$

and add reference **VE2015**

59. Page 657, Integral 6.314.1: the integral and its solution should be replaced by

$$\int_0^\infty \sin(bx)\Phi\left(\sqrt{\frac{a}{x}}\right)\,dx = \frac{1}{b}\left(1 - \cos\left(\sqrt{2ab}\right)\exp^{-\sqrt{2ab}}\right) \qquad [\mathrm{Re}\,a > 0, \quad \mathrm{Re}\,b > 0]$$

and add reference **VE2015**

60. Page 657, Integral 6.314.2: the integral and its solution should be replaced by

$$\int_0^\infty \cos(bx)\Phi\left(\sqrt{\frac{a}{x}}\right)\,dx = \frac{1}{b}\sin\left(\sqrt{2ab}\right)\exp^{-\sqrt{2ab}} \qquad [\mathrm{Re}\,a > 0, \quad \mathrm{Re}\,b > 0]$$

and add reference **VE2015**

61. Page 657, Integral 6.315.3: replace $b > 0$ with $b \neq 0$; add reference **VE2015**

62. Page 657, Integral 6.315.4: replace $\mathrm{Ei}\left(\frac{p}{4a^2}\right)$ with $\mathrm{Ei}\left(-\frac{p}{4a^2}\right)$ and replace $p > 0$ with $p \neq 0$; add reference **VE2015**

63. Page 657, Integral 6.315.5: expand the evalution, and correct the constraint, with

$$\frac{1}{2\sqrt{2\pi b}}\left[\ln\left(\frac{b+a\sqrt{2b}+a^2}{b-a\sqrt{2b}+a^2}\right)+2\arctan\left(\frac{a\sqrt{2b}}{b-a^2}\right)\right] \qquad [a>0, \quad b>0, \quad a<\sqrt{b}]$$
$$\frac{1}{2\sqrt{2\pi b}}\left[\ln\left(\frac{b+a\sqrt{2b}+a^2}{b-a\sqrt{2b}+a^2}\right)+2\arctan\left(\frac{a\sqrt{2b}}{b-a^2}\right)+2\pi\right] \qquad [a>0, \quad b>0, \quad a>\sqrt{b}]$$

and add reference **VE2015**

64. Page 657, Integral 6.317: expand the evalution, and correct the constraint, with

$$\frac{i}{a}\frac{\sqrt{\pi}}{2}e^{-\frac{b^2}{4a^2}} \qquad [\operatorname{Re} a^2>0, \quad b>0]$$
$$-\frac{i}{a}\frac{\sqrt{\pi}}{2}e^{-\frac{b^2}{4a^2}} \qquad [\operatorname{Re} a^2>0, \quad b<0]$$

and add reference **VE2015**

65. Page 657, Integral 6.318: the correct evaluation is

$$\frac{1}{2p}\left(e^{-p^2}-1\right)+\frac{\sqrt{\pi}}{2}\Phi(p) \qquad [\operatorname{Re} p>0]$$

and add reference **VE2015**

66. Page 668, Integral 6.511.7: generalize the result to

$$\int_0^a J_1(xy)\,dx = \frac{1}{y}\left[1-J_0(ay)\right] \qquad [a>0, \quad y\neq 0]$$

and add reference **VE2015**

67. Page 668, Integral 6.511.9: remove the constraint; add reference **VE2015**

68. Page 669, Integral 6.512.9: replace $b>0$ with $b\neq 0$; add reference **VE2015**

69. Page 669, Integral 6.512.10: replace the constraint with $[a>0, \quad b\neq 0, \quad a>|b|]$; add reference **VE2015**

70. Page 671, Integral 6.516.1: include the additional evaluation

$$-\frac{1}{b}J_\nu\left(\frac{a^2}{4b}\right) \qquad [a>0, \quad b<0, \quad \operatorname{Re}\nu>-\tfrac{1}{2}]$$

and add reference **VE2015**

71. Page 671, Integral 6.516.4: add the constraint $\operatorname{Re}\nu>-\frac{1}{2}$; add reference **VE2015**

72. Page 673, Integral 6.521.2: replace the constraint with $[\operatorname{Re}(a\pm ib)>0, \quad \operatorname{Re}\nu>-1]$; add reference **VE2015**

73. Page 673, Integral 6.521.7: remove $b > 0$; add reference **VE2015**

74. Page 673, Integral 6.521.8: replace the constraint with $[a > |b| \geq 0]$; add reference **VE2015**

75. Page 673, Integral 6.521.9: replace the constraint with $[a > |b| \geq 0]$; add reference **VE2015**

76. Page 673, Integral 6.521.12: remove $b > 0$; add reference **VE2015**

77. Page 673, Integral 6.521.13: replace the constraint with $[a > 0]$; add reference **VE2015**

78. Page 673, Integral 6.521.14: replace the constraint with $[a > |b| \geq 0]$; add reference **VE2015**

79. Page 673, Integral 6.521.15: replace the constraint with $[a > |b| \geq 0]$; add reference **VE2015**

80. Page 674, Integral 6.522.4: in the first constraint remove $c > 0$; in the second constraint remove $a > 0$; add reference **VE2015**

81. Page 674, Integral 6.522.5: remove the constraint $c > 0$ (in 2 places); add reference **VE2015**

82. Page 676, Integral 6.524.2: in the evaluation replace "a" with "$|a|$"; replace the constraint with $[a \neq 0, \quad b > 0]$; add reference **VE2015**

83. Page 676, Integral 6.525.1: replace the first constraint with $[\operatorname{Re} b > |\operatorname{Im} a|]$; replace the second constraint with $[\operatorname{Re} a > |\operatorname{Im} b|]$; add reference **VE2015**

84. Page 676, Integral 6.525.2: remove the constaint $c > 0$; add reference **VE2015**

85. Page 676, Integral 6.525.3: replace $K_0(bx)$ with $K_1(bx)$; replace the constraints with $[\operatorname{Re} b > 0]$; add reference **VE2015**

86. Page 676, Integral 6.526.1: replace "$(2a)^{-1}$" with "$(2|a|)^{-1}$"; replace the constraints with $[a \neq 0 \quad, b \geq 0, \quad \operatorname{Re} \nu > -1]$; add reference **VE2015**

87. Page 679, Integral 6.532.4: expand the evalution with

$$\begin{array}{rl} K_0(ak) & \text{if } [a > 0, \operatorname{Re} k > 0] \text{ or } [a < 0, \operatorname{Re} k < 0] \\ K_0(-ak) & \text{if } [a > 0, \operatorname{Re} k < 0] \text{ or } [a < 0, \operatorname{Re} k > 0] \end{array}$$

and add reference **VE2015**

88. Page 679, Integral 6.532.5: expand the evalution with

$$\begin{array}{cl} -\dfrac{K_0(ak)}{k} & [a > 0, \quad \operatorname{Re} k > 0] \\ \dfrac{K_0(-ak)}{k} & [a > 0, \quad \operatorname{Re} k < 0] \end{array}$$

and add reference **VE2015**

89. Page 679, Integral 6.532.6: expand the evalution with

$$\begin{aligned} \frac{\pi}{2k}\left[I_0(-ak) - \mathbf{L}_0(-ak)\right] \qquad & [a < 0, \quad \operatorname{Re} k > 0] \\ -\frac{\pi}{2k}\left[I_0(-ak) - \mathbf{L}_0(-ak)\right] \qquad & [a > 0, \quad \operatorname{Re} k < 0] \\ -\frac{\pi}{2k}\left[I_0(ak) - \mathbf{L}_0(ak)\right] \qquad & [a < 0, \quad \operatorname{Re} k < 0] \end{aligned}$$

and add reference **VE2015**

90. Page 697, Integral 6.533.3: expand the evalution with

$$\begin{aligned} -\frac{b}{4}\left[1 + 2\ln\left(\left|\frac{a}{b}\right|\right)\right] \qquad & \text{if } (a+b<0) \text{ and } ([0<b<a] \text{ or } [a<b<0] \text{ or } [a<0<b]) \\ -\frac{b}{4}\left[1 + 2\ln\left(\left|\frac{a}{b}\right|\right)\right] \qquad & [a+b>0 \quad b<0<a] \\ -\frac{a^2}{4b} \qquad & \text{if } (a+b>0) \text{ and } ([0<a<b] \text{ or } [b<a<0] \text{ or } [a<0<b]) \\ -\frac{a^2}{4b} \qquad & [a+b<0, \quad b<0<a] \end{aligned}$$

and add reference **VE2015**

91. Page 683, Integral 6.554.1: expand the evalution with

$$\begin{aligned} y^{-1}e^{ay} \qquad & [y > 0, \quad \operatorname{Re} a < 0] \\ -y^{-1}e^{ay} \qquad & [y < 0, \quad \operatorname{Re} a > 0] \\ -y^{-1}e^{-ay} \qquad & [y < 0, \quad \operatorname{Re} a < 0] \end{aligned}$$

and add reference **VE2015**

92. Page 687, Integral 6.566.2: the evaluation is also valid for the constraints $[a < 0, \operatorname{Re} b < 0, -1 < \operatorname{Re}\nu < \frac{3}{2}]$; add the reference ET II 23(12)

93. Page 687, Integral 6.566.3: expand the evalution with

$$\begin{aligned} \frac{\pi^2 b^{\nu-1}}{4\cos\nu\pi}\left[\mathbf{H}_{-\nu}(ab) - Y_{-\nu}(ab)\right] \qquad & [a > 0, \quad \operatorname{Re} b > 0, \quad \operatorname{Re}\nu > -\tfrac{1}{2}] \\ \frac{\pi^2 (-b)^{\nu-1}}{4\cos\nu\pi}\left[\mathbf{H}_{-\nu}(-ab) - Y_{-\nu}(-ab)\right] \qquad & [a > 0, \quad \operatorname{Re} b < 0, \quad \operatorname{Re}\nu > -\tfrac{1}{2}] \end{aligned}$$

and add reference **VE2015**

94. Page 687, Integral 6.566.4: expand the evalution with

$$\frac{\pi^2}{4b^{\nu+1}\cos\nu\pi}\left[\mathbf{H}_\nu(ab) - Y_\nu(ab)\right] \qquad [a>0, \quad \operatorname{Re} b>0, \quad \operatorname{Re}\nu<\tfrac{1}{2}]$$
$$\frac{\pi^2}{4(-b)^{\nu+1}\cos\nu\pi}\left[\mathbf{H}_\nu(-ab) - Y_\nu(-ab)\right] \qquad [a>0, \quad \operatorname{Re} b<0, \quad \operatorname{Re}\nu<\tfrac{1}{2}]$$

and add reference **VE2015**

95. Page 687, 6.566.5: expand the evalution with

$$\frac{\pi}{2b^{\nu+1}}\left[I_\nu(ab) - \mathbf{L}_\nu(ab)\right] \qquad [a>0, \quad \operatorname{Re} b>0, \quad \operatorname{Re}\nu>-\tfrac{5}{2}]$$
$$-\frac{\pi}{2(-b)^{\nu+1}}\left[I_\nu(-ab) - \mathbf{L}_\nu(-ab)\right] \qquad [a<0, \quad \operatorname{Re} b>0, \quad \operatorname{Re}\nu>-\tfrac{5}{2}]$$
$$\frac{\pi}{2(-b)^{\nu+1}}\left[I_\nu(-ab) - \mathbf{L}_\nu(-ab)\right] \qquad [a>0, \quad \operatorname{Re} b<0, \quad \operatorname{Re}\nu>-\tfrac{5}{2}]$$
$$\frac{\pi}{2(-b)^{\nu+1}}\left[I_\nu(-ab) + \mathbf{L}_\nu(-ab)\right] \qquad [a<0, \quad \operatorname{Re} b<0, \quad \operatorname{Re}\nu>-\tfrac{5}{2}]$$

and add reference **VE2015**

96. Page 699, Integral 6.592.7: replace $\sqrt{\pi}\sec(\nu\pi)$ with $\pi\sec\left(\frac{1}{2}\nu\pi\right)$; add the constraint $a \neq 0$; add reference **VE2015**

97. Page 702, Integral 6.611.2: replace the constraints with $[\operatorname{Re}(\alpha \pm ib) > 0, \quad |\operatorname{Re}\nu| < 1]$; replace the references with **VE2015**

98. Page 705, Integral 6.613: add the constraint $\operatorname{Re} z \geq 0$; add reference **VE2015**

99. Page 714, Integral 6.633.2: replace "$a > 0$" with "a real"; add reference **VE2015**

100. Page 718, Integral 6.648: replace $\left(\frac{a+be^x}{ae^x+b}\right)$ with $\left(\frac{a+be^x}{ae^x+b}\right)^\nu$; add reference **VE2015**

101. Page 725, Integral 6.671.7: add the evaluation of "∞" when $a = b$; add reference **VE2015**

102. Page 725, Integral 6.671.4

The term "$+\cot(\nu\pi)$" is incorrect and should have been "$\cot(\nu\pi)$"; that is, there should be a multiplication here and not an addition.

Correcting this, and simplifying the terms results in the following evaluation

$$= -\frac{\sin\left(\frac{\nu\pi}{2}\right)}{\sqrt{b^2-a^2}}\left\{\frac{a^\nu\cot(\nu\pi)}{\left(b+\sqrt{b^2-a^2}\right)^\nu} + \frac{\left(b+\sqrt{b^2-a^2}\right)^\nu}{a^\nu\sin(\nu\pi)}\right\}$$

(Thanks to Junggi Yoon for correcting this error.)

103. Page 732, Integral 6.681.12: replace $\frac{\pi}{2}$ with $\frac{\pi^2}{4}$; add the constraint $a \neq 0$; add reference **VE2015**

104. Page 734, Integral 6.686.5: replace the constraints with $[a \neq 0, \quad b \neq 0]$; add reference **VE2015**

105. Page 738, Integral 6.699.1 add the evaluation for the case $a = b$

$$\frac{\cos\left((\nu+\lambda)\frac{\pi}{2}\right)}{\sqrt{\pi}(2a)^{\lambda+1}} \frac{\Gamma(\nu+\lambda+1)\Gamma(-\lambda-\frac{1}{2})}{\Gamma(\nu-\lambda)} \qquad [b = a, \quad a \geq 0, \quad \operatorname{Re}\lambda < -\tfrac{1}{2}, \quad \operatorname{Re}(\nu+\lambda) > -2]$$

106. Page 738, Integral 6.699.2 add the evaluation for the case $a = b$

$$\frac{(-1)^{1-\lambda/2}}{\sqrt{\pi}(2a)^{\lambda+1}} \frac{\Gamma(-\lambda-\frac{1}{2})\Gamma(1+\nu+\lambda)}{\Gamma(\nu-\lambda)} \sin(\tfrac{1}{2}\nu\pi) \quad [b = a, \quad a \geq 0, \quad \operatorname{Re}\nu > -\lambda-1, \quad \lambda = -2, -4, \dots]$$
$$\frac{(-1)^{(3-\lambda)/2}}{\sqrt{\pi}(2a)^{\lambda+1}} \frac{\Gamma(-\lambda-\frac{1}{2})\Gamma(\nu+\lambda+1)}{\Gamma(\nu-\lambda)} \cos(\tfrac{1}{2}\nu\pi) \quad [b = a, \quad a \geq 0, \quad \operatorname{Re}\nu > -\lambda-1, \quad \lambda = -1, -3, \dots]$$

107. Page 754, 6.772.1: expand the evaluations to be

$$-\frac{1}{a}\left[\ln(2a) + \mathbf{C}\right] \qquad [a > 0]$$
$$\frac{1}{a}\left[\ln(-2a) + \mathbf{C}\right] \qquad [a < 0]$$

and add reference **VE2015**

108. Page 754, Integral 6.772.2: expand the evaluations to be

$$-\frac{1}{a}\left[\ln\left(\frac{a}{2}\right) + \mathbf{C}\right] \qquad [a > 0]$$
$$-\frac{1}{a}\left[\ln\left(-\frac{a}{2}\right) + \mathbf{C}\right] \qquad [a < 0]$$

and add reference **VE2015**

109. Page 754, Integral 6.772.3: replace $\frac{2}{b}\left(K_0(ab) + \ln a\right)$ with $\frac{2}{b}\left(K_0(|ab|) + \ln|a|\right)$; add the constraints $[a \neq 0, \quad b \neq 0]$; add reference **VE2015**

110. Page 754, Integral 6.772.4: expand the evaluations to be

$$\frac{2}{x}\operatorname{ker}(x) \qquad x > 0$$
$$\frac{2}{x}\operatorname{ker}(-x) \qquad x < 0$$

and add reference **VE2015**

111. Page 755, Integral 6.784.1: the solution is wrong. The correct solution is

$$\frac{1}{2\sqrt{\pi}}\left(\frac{b}{2}\right)^{\nu} \frac{1}{a^{2\nu+2}} \frac{\Gamma\left(\nu+\frac{3}{2}\right)}{\Gamma\left(\nu+2\right)} \Phi\left(\nu+\frac{3}{2}, \nu+2; -\frac{b^2}{4a^2}\right)$$

In the constraints, replace $b > 0$ with $b \neq 0$; add reference **VE2015**

112. Page 758, Integral 6.794.9

The current evaluation is

$$\frac{\pi^{3/2}a}{\boxed{2^{5/2}}\sqrt{b}}\exp\left(-b-\frac{a^2}{8b}\right)$$

which is incorrect. The correct evaluation is

$$\frac{\pi^{3/2}a}{2^{7/2}\sqrt{b}}\exp\left(-b-\frac{a^2}{8b}\right)$$

(Thanks to Angelo Melino for correcting this error.)

113. Page 760, Integral 6.812.1: expand the evaluations to be

$$\begin{aligned} \frac{\pi}{2a}\left[I_1(ab)-\mathbf{L}_1(ab)\right] &\qquad [\operatorname{Re} a>0, \quad b>0] \\ \frac{\pi}{2a}\left[I_1(-ab)-\mathbf{L}_1(-ab)\right] &\qquad [\operatorname{Re} a>0, \quad b<0] \\ -\frac{\pi}{2a}\left[I_1(-ab)-\mathbf{L}_1(-ab)\right] &\qquad [\operatorname{Re} a<0, \quad b>0] \\ -\frac{\pi}{2a}\left[I_1(ab)-\mathbf{L}_1(ab)\right] &\qquad [\operatorname{Re} a<0, \quad b<0] \end{aligned}$$

and add reference **VE2015**

114. Page 761, Integral 6.812.2: replace $\frac{a^2b^2}{2}$ with $\frac{a^2b^2}{4}$; add reference **VE2015**

115. Page 761, Integral 6.813.4: replace $a>0$ with $a\neq 0$; add reference **VE2015**

116. Page 761, Integral 6.813.5: replace $a>0$ with $a\neq 0$; add reference **VE2015**

117. Page 770, Integral 6.876.1: replace "$x \operatorname{kei} x\ J_1(ax)$" with "$\operatorname{kei}(x)\ J_1(ax)$"; replace $a>0$ with $a\neq 0$; add reference **VE2015**

118. Page 770, Integral 6.876.2: replace "$x \operatorname{ker} x\ J_1(ax)$" with "$\operatorname{ker}(x)\ J_1(ax)$"; replace $a>0$ with $a\neq 0$; add reference **VE2015**

119. Page 779, Integral 7.132.1: replace $\Gamma\left(\lambda+\frac{1}{2}\nu+1\right)$ with $\Gamma\left(\lambda+\frac{1}{2}\nu+\frac{1}{2}\right)$.

(Thanks to Bruno Daniel for correcting this error.)

120. Page 799, Integral 7.233: replace $\Gamma(\mu+n)$ with $\Gamma(\mu+n+1)$

(Thanks to Ramakrishna Janaswamy for correcting this error.)

121. Page 801, Integral 7.251.3: replace $y>0$ with $y\neq 0$; add reference **VE2015**

122. Page 810, Integral 7.355.1: remove the contraint $a>0$; add reference **VE2015**

123. Page 810, Integral 7.355.2: remove the contraint $a>0$; add reference **VE2015**

124. Page 811, Integral 7.374.4: the correct evaluation is $\sqrt{\pi}2^{n-1}\frac{(2m+n)!}{m!}(a^2-1)^m a^n$

125. Page 802, Integral 7.251.7: replace $\Gamma\left(\frac{1}{2}+\frac{1}{2}\nu-n\right)$ with $\Gamma\left(\frac{1}{2}\mu+\frac{1}{2}\nu-n\right)$

(Thanks to Ramakrishna Janaswamy for correcting this error.)

126. Page 810, Integral 7.354.1: replace $J_{2n+1}(x)$ with $J_{2n+1}(z)$.

(Thanks to Farid Bouttout for correcting this error.)

127. Page 811, Integral 7.374.7: replace $L_n^{n-m}(-2y^2)$ with $L_m^{n-m}(-2y^2)$; remove the constaint $m \le n$; add reference **VE2015**

128. Page 812, Integral 7.376.3: replace $\Gamma\left(\dfrac{\nu+1}{2}\right)$ with $\Gamma\left(\dfrac{\nu}{2}+1\right)$; add reference **VE2015**

129. Page 819, Integral 7.421.1: remove $y > 0$; add reference **VE2015**

130. Page 821, Integral 7.511.6

 (a) The evaluation of the integral is incorrect.
 The evaluation should be $= \dfrac{B(\lambda,\beta-\lambda)}{(1-z)^\alpha} = \dfrac{\Gamma(\beta-\lambda)\,\Gamma(\lambda)}{\Gamma(\beta)}\dfrac{1}{(1-z)^\alpha}$

 (b) The additional constraint $\operatorname{Re}\lambda > 0$ needs to be added

(Thanks to Gerald Edgar for correcting this error.)

131. Page 821, Integral 7.511.9: replace $(1-z)^\sigma$ with $(1-z)^{-\sigma}$

(Thanks to Gerald Edgar for correcting this error.)

132. Page 821, Integral 7.512.6: replace $B(\lambda,\beta-\lambda)\ F(\alpha,\lambda;\gamma;z)$ with $B(\lambda,\beta-\lambda)\ F(\alpha,\lambda;\lambda;z) = B(\lambda,\beta-\lambda)\ (1-z)$; add reference **VE2015**

133. Page 822, Integral 7.522.1

The current evaluation, which is incorrect, is

$$\frac{\Gamma(\delta)\lambda^{-\gamma}}{\Gamma(\alpha)\Gamma(\beta)}E(\alpha;\beta:\gamma;\delta:\lambda)$$

The correct evaluation, which only differs in the "punctuation" is

$$\frac{\Gamma(\delta)\lambda^{-\gamma}}{\Gamma(\alpha)\Gamma(\beta)}E(\alpha,\beta,\gamma:\delta:\lambda)$$

(Thanks to Aaron Hendrickson for correcting this error.)

134. Page 825, Integral 7.531.1: add the constraint $c > 0$; add reference **VE2015**

135. Page 840, Integral 7.662.4: the solution for $[a < 0, \quad \operatorname{Re} y > 0, \quad \operatorname{Re}\mu > -\frac{1}{2}]$ is the negative of the solution shown. add reference **VE2015**

136. Page 851, Integral 7.731.1: replace $\operatorname{Re}^2 a > 0$ with $\operatorname{Re} a^2 > 0$; add reference **VE2015**

137. Page 853, Integral 7.751.1: replace the constraint with $[y \neq 0, \quad a \neq 0, \quad n = 1, 3, 5, 7 \ldots]$; add reference **VE2015**

138. Page 853, Integral 7.751.2: replace the constraint with $[y \neq 0, \quad a \neq 0]$; add reference **VE2015**

139. Page 853, Integral 7.751.3

     The current integrand can be slightly generalized, and the evaluation simplified, as follows:

$$\int_0^\infty J_0(xy) D_\nu(ax) D_{\nu+1}(x)\, dx = \begin{cases} -\dfrac{1}{y}\left[D_\nu\left(\dfrac{y}{a}\right) D_{\nu+1}\left(-\dfrac{y}{a}\right) - \dfrac{\sqrt{\pi}}{\sqrt{2}\Gamma(-\nu)}\right] & [y \neq 0, \quad a > 0] \\ -\dfrac{1}{y}\, D_\nu\left(\dfrac{y}{a}\right) D_{\nu+1}\left(-\dfrac{y}{a}\right) & [y \neq 0, \quad a \neq 0, \quad \nu = 0, 1, 2, \ldots] \end{cases}$$

     add reference **VE2015**

     This should replace the current value in the 8th edition (which corresponds to the value $a = 1$).

140. Page 853, Integral 7.752.1: replace $y > 0$ with $y \neq 0$; add reference **VE2015**

141. Page 853, Integral 7.752.3: replace $y > 0$ with $y \neq 0$; add reference **VE2015**

142. Page 853, Integral 7.752.4: replace $y > 0$ with $y \neq 0$; add reference **VE2015**

143. Page 853, Integral 7.752.5: replace $y > 0$ with $y \neq 0$; add reference **VE2015**

144. Page 854, Integral 7.752.10: replace $y > 0$ with $y \neq 0$; add reference **VE2015**

145. Page 854, Integral 7.752.12: replace $y > 0$ with $y \neq 0$; add reference **VE2015**

146. Page 856, Integral 7.755.1: replace $y > 0$ with $y \neq 0$; replace $2^{-3/2}$ with $2^{-1/2}$; add reference **VE2015**

147. Page 857, Integral 7.771: add $\beta > 0$ to each constraint, replace "ET II 298(22)" with "ET II 398(22)"

148. Page 897, Integral 8.250.5: add $[\operatorname{Re} p > 0, \quad y > 0]$; add reference **VE2015**

149. Page 897, Integral 8.250.8: replace $\Phi\left(-\frac{x^2}{2}\right)$ with $\Phi\left(-\frac{p^2}{2}\right)$; add reference **VE2015**

150. Page 897, Integral 8.250.9

     (a) The evaluation is missing a minus sign; the result should be $-\sqrt{\pi}\Phi(a)\Phi(b)$
     (b) add reference **VE2015**

151. Page 898, Formula 8.254: replace "$|\arg(-z)|$" with "$|\arg(z)|$".

     (Thanks to Martin Venker for correcting this error.)

152. Page 898, Formula 8.258.3: replace "F_1" with "${}_1F_1$"; add reference **VE2015**

153. Page 900, Integral 8.258.5: replace "$1 \quad \arctan(\sqrt{\beta})$" with "$\arctan(\sqrt{\beta})$"; add reference **VE2015**

154. Page 909, Formula 8.352.3: replace $\sum_{k=1}^{m}$ with $\sum_{k=1}^{n}$.

(Thanks to Mariam Mousa Harb for correcting this error.)

155. Page 909, Integral 8.352.7: replace e^{-z} with e^{-x}.

(Thanks to Mariam Mousa Harb for correcting this error.)

156. Page 984, Relation 8.816

The evaluation on the right hand side is incorrect.

The correct evaluation is obtain be replacing "$(-1)^m$" with "$(-i)^m$".

(Thanks to Joseph Gangestad for correcting this error.)

157. Page 997, Relations in 8.922

(a) (8.922.1) For clarity, change the summation upper limit from ∞ to n
(b) (8.922.2) For clarity, change the summation upper limit from ∞ to n
(c) (8.922.1) Add the additional evaluation

$$z^{2n} = \sum_{k=0}^{n} 2^{2n-2k+1}(4n-4k+1)\frac{(2n)!(2n-k+1)!}{k!(4n-2k+2)!}P_{2n-2k}(z)$$

(d) (8.922.2) Add the additional evaluation

$$z^{2n+1} = \sum_{k=0}^{n} 2^{2n-2k+2}(4n-4k+3)\frac{(2n+1)!(2n-k+2)!}{k!(4n-2k+4)!}P_{2n-2k+1}(z)$$

(Thanks to Patrick Bruno for correcting this error.)

158. Page 1004, Integral 8.949.7: replace $(1-x^2)^{c\frac{1}{2}}$ with $(1-x^2)^{\frac{1}{2}}$.

(Thanks to Farid Bouttout for correcting this error.)

159. Page 1008, Relation 8.961.1

While correct, the relation is not in it's most general form.

The current

$$P_n^{(\alpha,\alpha)}(-x) = (-1)^n P_n^{(\alpha,\alpha)}(x)$$

should be replaced with

$$P_n^{(\alpha,\beta)}(-x) = (-1)^n P_n^{(\beta,\alpha)}(x)$$

(Thanks to Michal Wierzbicki for correcting this error.)

160. Page 1034, Integral 9.221: add the constraint $\operatorname{Re}(\mu \pm \lambda) > -\frac{1}{2}$; add reference **VE2015**

161. Page 1038, Integral 9.245.1: replace "x is real" with "$x \geq 0$"; add reference **VE2015**