Errors in the 30th edition of *Standard Mathematical Tables and Formulae* (First Printing)

NOTE THAT THERE MAY EXIST ERRORS IN THIS PRINTING THAT WERE NOT CORRECTED IN THE NEXT PRINTING. PLEASE LOOK AT THE LIST OF ERRATA FOR LATER PRINTINGS.

1. Among the pages before the numbered pages, one contributor is listed as "Lawrence M. Glasser", this should be changed to "M. Lawrence Glasser".

2. On page 10, the powers of 2 from 41–50 are missing. Add the following to the bottom of the table:

n	2^n	n	2^n
41	2199023255552	81	2417851639229258349412352
42	4398046511104	82	4835703278458516698824704
43	8796093022208	83	9671406556917033397649408
44	17592186044416	84	19342813113834066795298816
45	35184372088832	85	38685626227668133590597632
46	70368744177664	86	77371252455336267181195264
47	140737488355328	87	154742504910672534362390528
48	281474976710656	88	309485009821345068724781056
49	562949953421312	89	618970019642690137449562112
50	1125899906842624	90	1237940039285380274899124224

3. On page 19, second displayed equation, we have

$$\sum_{n=0}^{\infty} E_n \frac{t^n}{n!} = \frac{2}{e^t + 1}$$

This is incorrect. It should be

$$\sum_{n=0}^{\infty} E_n \frac{t^n}{n!} = \frac{2e^t}{e^{2t} + 1}$$

4. On page 28, sequence number 79, the last entry is now a "2". This is incorrect, it should be a "26".

5. On page 36, **Other types of series**, number 2, we presently have

$$\sum_{n=1}^{N}(a+nb)x^n = \frac{a-(a+bN)x^{n+1}}{1-x} + \frac{bx(1-x^n)}{(1-x)^2} \qquad (x \neq 1)$$

   This is incorrect. It should say (note $n \to N$)

$$\sum_{n=1}^{N}(a+nb)x^n = \frac{a-(a+bN)x^{N+1}}{1-x} + \frac{bx(1-x^N)}{(1-x)^2} \qquad (x \neq 1)$$

6. On page 38, second line of first displayed equation, replace "$(x-[x])$" with "$(x - \lfloor x \rfloor)$"

7. On page 40, "Exponential functions", move the phrase "(all real values of x)" from the first equality to the second equality.

8. On page 43, third line for $\coth x$, change $2x\left[+\frac{1}{\pi^2+x^2}+\ldots\right]$ to $2x\left[\frac{1}{\pi^2+x^2}+\ldots\right]$

9. On page 46, line -7, replace "Equation (1.3.1)" with "Equation (1.4.1)".

10. On page 48, line $+2$, replace "Equation (1.3.1)" with "Equation (1.4.1)".

11. On page 52, line -10, we presently have

    ... That is, $\lim_{h\to 0}\frac{f(z_0+h)-f(z)}{h}$ exists. ...

    This is incorrect. It should say

    ... That is, $\lim_{h\to 0}\frac{f(z_0+h)-f(z_0)}{h}$ exists. ...

12. On page 64, line 11, replace "all x in domain" with "all x in the domain"

13. On page 65, lines 10–11, we presently have

    (*Archimedean property of* $\mathcal{R}$) For every real number x there is an integer N such that $x < n$.

    This is incorrect. It should say

    (*Archimedean property of* $\mathcal{R}$) For every real number x there is an integer N such that $x < N$.

14. On page 68, line18, "$n \in \mathcal{N}$" with "$n \geq \mathcal{N}$".

15. On page 70, section 1.6.9, line 10, we presently have

    $\sum_{n=1}^{N} a_n\phi_n$ is $\frac{1}{b-a}\int_a^b |f(x) - \sum_{n=1}^{N} \phi_n(x)|^2 dx$. An orthonormal set ...

    This is incorrect. It should say

    $\sum_{n=1}^{N} a_n\phi_n$ is $\frac{1}{b-a}\int_a^b |f(x) - \sum_{n=1}^{N} a_n\phi_n(x)|^2 dx$. An orthonormal set ...

16. On page 71, section 1.6.10, item 3, line 4, replace "use" with "used".

17. On page 71, section 1.6.10, item 8, lines 2–3, we presently have

    ... series $\sum_{k=0}^{x_0} a_k g_k(x)$ is ... expressed as $f(x) \sim \sum_{k=0}^{x_0} a_k g_k(x)$.

    This is incorrect. It should say

    ... series $\sum_{k=0}^{\infty} a_k g_k(x)$ is ... expressed as $f(x) \sim \sum_{k=0}^{\infty} a_k g_k(x)$.

18. On page 83, last line of text in section 2.2.3, replace "given by" with "given by the solutions of".

19. On page 85, first note, replace 'For polynomial" with "For the polynomial".

20. On page 99, item 2 now has the text

    All the known Mersenne primes, ..., 756839, 859433.

    This is incorrect. It should say

    All the known Mersenne primes, ..., 756839, 859433, 1257787.

21. On page 98, section 2.3.11, it now says "September 1995". This should be changed to "September 1996".

22. On page 98, the table begins

Number	Number of digits
$2^{859433} - 1$	[a]258,716
$2^{756839} - 1$	227,832
$391581 \cdot 2^{216193} - 1$	[b]65,087
$2^{216091} - 1$	65,050
$\vdots$	$\vdots$

    [a] Largest prime of the form $2^n - 1$, a Mersenne prime.
    [b] Largest non-Mersenne prime.

    This should be changed to (note new top line, and addition of the word "known"):

Number	Number of digits
$2^{1257787}-1$	[a]378,632
$2^{859433}-1$	258,716
$2^{756839}-1$	227,832
$391581\cdot 2^{216193}-1$	[b]65,087
$2^{216091}-1$	65,050
$\vdots$	$\vdots$

[a]Largest known prime of the form 2^n-1, a Mersenne prime.
[b]Largest known non-Mersenne prime.

Note that the last, say, three lines of the table should be deleted.

23. On page 99, fourth bullet, is "4977!! + 1 (largest ...". This entire line should be deleted.

24. On page 99, item 3 now has the text

> The largest known twin primes are: $697053813\cdot 2^{16352}\pm 1$ (with 4,932 digits), $1691232\cdot 1001\cdot 10^{4020}\pm 1$ (with 4,030 digits), and $4650828\cdot 1001\cdot 10^{3429}\pm 1$ (with 3,439 digits).

This is incorrect. It should say

> The largest known twin primes are: $242206083\cdot 2^{38880}\pm 1$ (with 11,713 digits), $570918348\cdot 10^{5120}\pm 1$ (with 5,129 digits), and $697053813\cdot 2^{16352}\pm 1$ (with 4,932 digits).

25. On page 101, table heading, replace "Values of n for" with "Values of n or p for"

26. On page 101, 4th sequence, we presently have the numbers

> 3, 5, 11, 41, ...

This is incorrect (there is a missing term in the sequence). It should say

> 3, 5, 11, 13, 41, ...

27. On page 101, section 2.3.12, line 3, the number "0.142856 142856..." should be "0.142857 142857...".

28. On page 119, item 12, second sentence, now reads:

> All real matrices are Hermitian.

This is incorrect. It should say

> All real symmetric matrices are Hermitian.

29. On page 126, equation (2.5.19), last line, now reads:

$$a_{m1}x_1 + a_{m1}x_2 + \cdots + a_{mn}x_n = c_m$$

This is incorrect. It should say

$$a_{m1}x_1 + a_{m2}x_2 + \cdots + a_{mn}x_n = c_m$$

30. On page 128:

    (a) line 6, replace "$\mathbf{b}_S = \mathbf{P}_S v$" with "$\mathbf{b}_S = \mathbf{P}_S \mathbf{v}$"

    (b) On page 128, item number 2, first displayed equation, now reads:

$$R(\mathbf{A}) = \{\mathbf{y} \mid \mathbf{A}\mathbf{y} = \mathbf{x};\ \mathbf{x} \in \mathcal{R}^m\}$$

    This is incorrect. It should say

$$R(\mathbf{A}) = \{\mathbf{y} \mid \mathbf{A}\mathbf{y} = \mathbf{x};\ \mathbf{x} \in \mathcal{R}^n\}$$

    (c) item number 3: delete the word "four" (appears twice, once in each sentence)

    (d) Equation (2.5.23): delete the third line of the 4 equations

    (e) Equation (2.5.24): delete the fourth line of the 4 equations

    (f) Page 128, line -6, replace "$x_+ = \tilde{\mathbf{A}}b$" with "$\mathbf{x}_+ = \tilde{\mathbf{A}}\mathbf{b}$"

31. On page 131, top line, we presently have

    The characteristic polynomial $\det(\mathbf{A} - \lambda\mathbf{I}) = \sum_{i=0}^{m} r_i \lambda^i$ has...

    This is incorrect. It should say (note the upper limit)

    The characteristic polynomial $\det(\mathbf{A} - \lambda\mathbf{I}) = \sum_{i=0}^{n} r_i \lambda^i$ has...

32. Page 131, note number 4, replace "*eigenvector* $\mathbf{x}$ that" with "*eigenvector* $\mathbf{x}$ (different from $\mathbf{0}$) that"

33. Page 133, section 2.5.15, note 3, replace "$u(x)$" with "$u(\mathbf{x})$"

34. On page 135, note 4, line 3, replace "$(b_1, \ldots, b_n)$" with "$(b_1, \ldots, b_n)^{\mathrm{T}}$"

35. On page 136, first displayed equation, replace "$\mathbf{A} \otimes \mathbf{B} = \begin{bmatrix} a_{11}B & a_{12}B \\ a_{21}B & a_{22}B \end{bmatrix}$" with
"$\mathbf{A} \otimes \mathbf{B} = \begin{bmatrix} a_{11}\mathbf{B} & a_{12}\mathbf{B} \\ a_{21}\mathbf{B} & a_{22}\mathbf{B} \end{bmatrix}$".

36. On page 140

    (a) note 11, fourth bullet, replace "page 150" with "page 151".

(b) note 5, last line, replace "pages 151 and 152" with "pages 152 and 152".

(c) note 6, first line, replace "groups, called the" with "groups, the".

(d) note 8, replace "entried" with "entries".

37. On page 147, top table, "permuation" should be "permutation".

38. On page 163, section 3.1.2, after the first sentence insert the following sentence:

> The letters P, Q, and R are used to designate compound statements.

39. On page 164, section 3.1.4, second sentence. If space permits, replace

> For example, if P ...

with

> For example, suppose that P and Q are compound statements. Then if P ...

40. On page 171, replace the two occurrences of "$\cdots + = 2^{n-1}$" with "$\cdots = 2^{n-1}$".

41. On page 174, line 11, the last expression is

$$x^{(3)} = x(x-1)(x-2) = 2x-3x^2+x^3 = \begin{bmatrix} 3 \\ 1 \end{bmatrix} x + \begin{bmatrix} 3 \\ 2 \end{bmatrix} x^2 + \begin{bmatrix} 3 \\ 2 \end{bmatrix} x^3$$

This is incorrect. It should say (look at the lower value in the last Stirling number)

$$x^{(3)} = x(x-1)(x-2) = 2x-3x^2+x^3 = \begin{bmatrix} 3 \\ 1 \end{bmatrix} x + \begin{bmatrix} 3 \\ 2 \end{bmatrix} x^2 + \begin{bmatrix} 3 \\ 3 \end{bmatrix} x^3$$

42. On page 174, section 3.2.9, first paragraph, we presently have

> The Stirling cycle number, $\left\{ {n \atop m} \right\}$, is the number of ways to partition n into k blocks. (Equivalently, it is the number of ways that n distinguishable balls can be placed in k indistinguishable cells, with no cell empty.)

This is incorrect. It should say (note $k \to m$)

The Stirling cycle number, $\left\{ {n \atop m} \right\}$, is the number of ways to partition n into m blocks. (Equivalently, it is the number of ways that n distinguishable balls can be placed in m indistinguishable cells, with no cell empty.)

43. On page 175, line 4, the last expression is

$$x^3 = \left\{ {3 \atop 1} \right\} x^{(1)} + \left\{ {3 \atop 2} \right\} x^{(2)} + \left\{ {3 \atop 2} \right\} x^{(3)}$$

This is incorrect. It should say (look at the lower value in the last Stirling number)

$$x^3 = \left\{ {3 \atop 1} \right\} x^{(1)} + \left\{ {3 \atop 2} \right\} x^{(2)} + \left\{ {3 \atop 3} \right\} x^{(3)}$$

44. Page 177–178: these are combinations, not permutations. Hence, these pages should appear after the tables on pages 179–180.

45. On page 186,

    (a) In the displayed equation, there should be a comma after the "1".

    (b) The definition of **degree sequence** should be:

    > A sequence $(d_1, \ldots, d_n)$ is a degree sequence of a graph if there is some ordering $v_1, \ldots, v_n$ of the vertices for which d_i is the degree of v_i for each i.

46. On page 189,

    (a) In the definition of **2-switch**, the last line now has "edges $\{v, x\}$ and $\{w, y\}$ is". This should be changed to "edges $\{v, y\}$ and $\{x, w\}$ is".

    (b) In the definition of **thickness**, the last line now has "union of planar graphs". This should be changed to "union of k planar graphs".

47. On page 193:

    (a) We now have "$\mathcal{G}_{3,1} = \{K_2 \cup \overline{K}_1\}$", this should be changed to "$\mathcal{G}_{3,1} = \{K_2 \cup K_1\}$".

    (b) We now have "$\mathcal{G}_{4,4} = \{C_4, P_2 \cdot K_3\}$", this should be changed to "$\mathcal{G}_{4,4} = \{C_4, (K_2 \cup K_1) + K_1\}$".

48. On page 196,

    (a) Note 11, insert "(Appel–Haken)" before *Four-Color Theorem:*.

    (b) Note 1, part (i), replace "d(u,v)" with "$d(u, v)$".

49. On page 200,

(a) Last line of text (just above bottom table) now says:

> The numbers of . . . following table:"

This is incorrect and should be replaced by

> The following table lists the number of isomorphism classes of graphs of order n and size m.

(b) Bottom table, there are two lines corresponding to $m = 9$. The first line should be removed, it is redundant and wrong.

50. On page 201, second table, line 4, we presently have the numbers

> 1 1 2 3 7 16 54 283

This is incorrect. It should say

> 1 1 2 3 7 16 54 243

51. On page 219, second line of text, replace "*self-doubt*" with "*self-dual*".

52. On page 232, left column

(a) line 10 of the table, "$\sin(\beta n)$" should be replaced by "$\cos(\beta n)$" (that is, the second occurrence of "$\sin(\beta n)$" should be replaced).

(b) lines 11–12 of the table, replace "a_n" with "a^n".

53. On page 234, the "Logistic Equation" section,

(a) second line of equation (3.9.24), replace "$\alpha \in [0, 4]$" with "$\alpha \in [0, k]$".

(b) first line after equation (3.9.24), replace "$rk \leq 4$" with "$r \leq 4$".

(c) item number 1, replace "When $r = k = 2$" with "When $r = k = 4$".

(d) equation (3.9.25), replace "$x_{n+1} = 2x_n - x_n^2$" with "$x_{n+1} = 4x_n - x_n^2$".

(e) first line after equation (3.9.25), replace "$\alpha = 2\sin^2$" with "$\alpha = 4\sin^2$".

(f) equation (3.9.26), replace "$2\sin^2$" with "$4\sin^2$" (once in each line of this equation).

54. On pages 234 and 235, the "Logistic Equation" section, replace all six occurrences of "$\pi\theta)$" with "$\theta)$"

55. On page 235, remainder of section 3.9, remove the three occurrences of the number "4".

56. On page 237, equation (3.11.1), we presently have (in part)

$$x_j \geq \quad \text{for} \quad j = 1, \ldots, n,$$

This is incorrect. It should say

$x_j \geq 0$ for $j = 1, \ldots, n$,

57. On page 237, line -3 replace "$(x_1, x_2, \ldots, x_n)$" with "$(x_1, x_2, \ldots, x_n)^{\mathrm{T}}$".

58. On page 237, line -2 replace "$(b_1, b_2, \ldots, b_m)$" with "$(b_1, b_2, \ldots, b_m)^{\mathrm{T}}$".

59. On page 241, middle of page, replace "kth" with "k^{th}".

60. On page 247, reference 3, replace "to appear" with "1996".

61. On page 274, line -11 replace "are parallel (Figure" with "are parallel and the diagonals intersect in the middle (Figure".

62. On page 274, lines -2 and -3, replace "The diagonals of a rectangle intersect in the middle." with "The diagonals of a rectangle have the same length."

63. On page 275, line 1, replace "the rhombus or diamond, where opposite sides... The diagonals of a rhombus are perpendicular and intersect in the middle." with "the rhombus or diamond, where adjacent sides ... The diagonals of a rhombus are perpendicular.".

64. On page 276, section 4.5.3, first paragraph, we now have

> A polygon is *regular* if all its angles are equal. This also implies that all sides are equal. (However, the sides can be equal even if the polygon is not regular, as in the case of the *rhombus*).

This is incorrect. It should say

> A polygon is *regular* if all its sides are equal and all its angles are equal. Either condition implies the other in the case of a triangle, but not in general. (A rhombus has equal sides but not necessarily equal angles, and a rectangle has equal angles but not necessarily equal sides.)

65. Page 288, line -6 replace "$x = a(1 + \sin 2\theta)$" with "$x = a\cos^2\theta$".

66. Page 290, caption for figure 4.8.23, replace "for $k = .5a$, $.9$, a, $1.1a$ and $1.5a$" with "for $k = .5a$, $.9a$, a, $1.1a$ and $1.5a$".

67. Page 301 (equation (4.10.3) and last equation on page), and also page 302 (line 5): "$(x, y) \mapsto$" should be "$(x, y, z) \mapsto$".

68. Page 305, line 1: "x and y:" should be "x, y, and z:"

69. Page 309, last expression before section 4.15.1: should be $\sqrt{|\Gamma/2\Delta|}$.

70. Page 309, line -2 (for regular dodecahedron) the "$2\sqrt{5}$" should be "$2/\sqrt{5}$".

71. Page 314, equation (4.18.1), now has

$$S = \left(\sum_{i=1}^{n} \theta_i (n-2) - \pi \right) r^2$$

This is incorrect. It should say

$$S = \left(\sum_{i=1}^{n} \theta_i - (n-2)\pi \right) r^2$$

72. On page 320, table at top,

    - In the table text we have "With", this should be "with".
    - We presently have the numbers

      1 1 2 3 7 21 49 166 549

      This is incorrect. It should say

      1 1 2 3 7 21 49 165 552

73. On page 321, fourth paragraph, we have

    > ... is *equivalent* to C^k regular parametric representation $\mathbf{g}$ if an only ...

    This is incorrect. It should say

    > ... is *equivalent* to a C^k regular parametric representation $\mathbf{g}$ if and only ...

74. On page 321, fifth paragraph, we have

    > A *regular curve C of class* C_k is an equivalence

    This is incorrect. It should say

    > A *regular curve C of class* C^k is an equivalence

75. On page 324, first line after the displayed matrix

    > whose the real ...

    This is incorrect. It should say

    > where the real ...

76. On page 324, line -1, replace "$g(u,v)\,du^2$" with "$g(u,v)\,dv^2$".

77. On page 327, line 8, in the Gauss–Mainardi–Codazzi equations

    $$b_{\alpha\beta,\gamma} - b_{\alpha\gamma,\beta} + \Gamma^{\gamma}_{\alpha\beta} b_{\delta\gamma} - \Gamma^{\delta}_{\alpha\gamma} b_{\delta\beta} = 0$$

    This is incorrect. It should say (Note indices in first Γ)

    $$b_{\alpha\beta,\gamma} - b_{\alpha\gamma,\beta} + \Gamma^{\delta}_{\alpha\beta} b_{\delta\gamma} - \Gamma^{\delta}_{\alpha\gamma} b_{\delta\beta} = 0$$

78. On page 335, formulae 11, we presently have

$$\frac{d^2}{dx^2}\left(f(x)\right) = \frac{df(u)}{du}\frac{\partial^2 u}{\partial x^2} + \frac{d^2 f(u)}{du^2}\left(\frac{du}{dx}\right)^2$$

This is incorrect. It should say

$$\frac{d^2}{dx^2}\left(f(x)\right) = \frac{df(u)}{du}\frac{d^2 u}{dx^2} + \frac{d^2 f(u)}{du^2}\left(\frac{du}{dx}\right)^2$$

79. On page 337, second equation from bottom of page, we presently have

$$\frac{\partial F}{\partial x_i} = \frac{\partial f}{\partial x_i} + \boldsymbol{\lambda}^{\mathrm{T}}\frac{\partial \mathbf{G}}{\partial x_i} = 0 \qquad \text{and} \qquad \frac{\partial F}{\partial \lambda_j} = g_j = 0$$

This is incorrect. It should say

$$\frac{\partial F}{\partial x_i} = \frac{\partial f}{\partial x_i} + \boldsymbol{\lambda}^{\mathrm{T}}\frac{\partial \mathbf{g}}{\partial x_i} = 0 \qquad \text{and} \qquad \frac{\partial F}{\partial \lambda_j} = g_j = 0$$

80. On page 341, last expression before section 5.2, we presently have

$$+(I_p \otimes Y)\tfrac{\partial Y}{\partial Z}$$

This is incorrect. It should say

$$+(I_p \otimes X)\tfrac{\partial Y}{\partial Z}$$

81. On page 347, note 4, we now have

$$\textstyle\int_a^b [af(x) + bg(x)]\,dx = a\int_a^b f(x)\,dx + b\int_a^b g(x)\,dx$$

This is confusing. It should be replaced by

$$\textstyle\int_a^b [cf(x) + dg(x)]\,dx = c\int_a^b f(x)\,dx + d\int_a^b g(x)\,dx$$

82. On page 349, Useful transformations, number 4 and 5, the transformation is now written as "when $z = \tan\frac{x}{a}$". This is incorrect, it should be "when $z = \tan\frac{x}{2}$".

83. On page 360, make the following statement the second bullet on the page:

> Logarithmic expressions are to base $e = 2.71828\ldots$, unless otherwise specified, and are to be evaluated for the absolute value of the arguments involved therein.

84. On page 367, above rule number 108 is

> If $q = 0$ then $X = c\left(x + \frac{b}{2c}\right)$ and ...

This is incorrect. It should say

If $q = 0$ then $X = c\left(x + \frac{b}{2c}\right)^2$ and ...

85. On page 390, rule number 479 has the integral

$$\int \log ax + b\, dx = \ldots$$

This is incorrect. It should say

$$\int \log(ax + b)\, dx = \ldots$$

86. On page 410, **constant coefficient equation**, the equation is represented as

$$a_0 y^{(n)} + a_1 y^{(n-1)} + \cdots + a_{n-1} y + a_n y = 0$$

This is incorrect. It should be

$$a_0 y^{(n)} + a_1 y^{(n-1)} + \cdots + a_{n-1} y' + a_n y = 0$$

87. On page 410, line -2, replace "$M(x, y)+dx+N(x, y) \neq 0$" with "$M(x, y)dx+N(x, y)dy \neq 0$".

88. On page 413, section 5.6.8, equation number 4 (Bessel equation transformed) the solution is missing the statement: $q \equiv \sqrt{p^2 - \beta^2}$.

89. On page 419, last equation on page, replace "$x_N(s = 0) = h_N(\mathbf{t})$" with "$x_N(s = 0, \mathbf{t}) = h_N(\mathbf{t})$".

90. On page 423 the first equation (last row of the matrix, first term) now is "$\Phi_{31}(u^1)$" This is incorrect. It should be "$\Phi_{31}(u^3)$".

91. On page 428, note 3, replace the three occurrences of "L" with "$\mathcal{L}$".

92. On page 429, note 4, replace the three occurrences of "F" with "$\mathcal{F}$".

93. On page 432, item number 5, in the displayed equation, the right-most term in the "r factors" is now "$\frac{\partial \tilde{x}^{i_r}}{\partial \tilde{x}^{k_r}}$". This is incorrect, it should say (note the tilde) "$\frac{\partial \tilde{x}^{i_r}}{\partial x^{k_r}}$".

94. On page 432, equation (5.10.4) reads

$$T_3{}^{i_1 \cdots i_r k_1 \cdots k_t}_{j_1 \cdots j_s \ell_1 \cdots \ell_u} = T_1{}^{i_1 \cdots i_r}_{j_1 \cdots j_s} T_2{}^{k_1 \cdots k_t}_{\ell_1 \cdots \ell_u}.$$

This is incorrect. It should read (Note font size in $l_1 \cdots l_u$)

$$T_3{}^{i_1 \cdots i_r k_1 \cdots k_t}_{j_1 \cdots j_s \ell_1 \cdots \ell_u} = T_1{}^{i_1 \cdots i_r}_{j_1 \cdots j_s} T_2{}^{k_1 \cdots k_t}_{\ell_1 \cdots \ell_u}.$$

95. On page 432, equation (5.10.6) reads

$$\mathcal{A}(T)_{i_1\cdots i_r} = T_{[i_1\cdots i_r]} = \frac{1}{r!}\sum_{\sigma\in S_r}\operatorname{sgn}(\sigma)T_{i_{\sigma(1)}\cdots i_{\sigma(1)}},$$

This is incorrect. It should read (Note subscript positioning and $\sigma(r)$)

$$\mathcal{A}(T)_{i_1\cdots i_r} = T_{[i_1\cdots i_r]} = \frac{1}{r!}\sum_{\sigma\in S_r}\operatorname{sgn}(\sigma)T_{i_{\sigma(1)}\cdots i_{\sigma(r)}},$$

96. On page 433, equation (5.10.8) (line 2) presently has

$$\cdots+\Gamma^{i_r}{}_{\ell k}T^{\ell_i\cdots i_{r-1}\ell}{}_{j_1\cdots j_s}-\Gamma^{\ell}{}_{j_1 k}T^{i_1\cdots i_r}{}_{\ell j_2\cdots j_s}\cdots-\Gamma^{\ell}{}_{j_s k}T^{i_1\cdots i_r}{}_{j_1\cdots j_{s-1}\ell},$$

This is incorrect. It should say (note the first superscript of the first T)

$$\cdots+\Gamma^{i_r}{}_{\ell k}T^{i_1\cdots i_{r-1}\ell}{}_{j_1\cdots j_s}-\Gamma^{\ell}{}_{j_1 k}T^{i_1\cdots i_r}{}_{\ell j_2\cdots j_s}\cdots-\Gamma^{\ell}{}_{j_s k}T^{i_1\cdots i_r}{}_{j_1\cdots j_{s-1}\ell},$$

97. On page 433, equation (5.10.9) presently has

$$\partial_k T^{i_1\cdots i_r}{}_{j_i\cdots j_s} = T^{i_1\cdots i_r}{}_{j_1\cdots j_s,k} = \frac{\partial T^{i_1\cdots i_r}{}_{j_1\cdots j_s,k}}{\partial x^k}$$

This is incorrect. It should say (note the last subscript on the last T)

$$\partial_k T^{i_1\cdots i_r}{}_{j_i\cdots j_s} = T^{i_1\cdots i_r}{}_{j_1\cdots j_s,k} = \frac{\partial T^{i_1\cdots i_r}{}_{j_1\cdots j_s}}{\partial x^k}$$

98. On page 433, item number 4, line 3, we now have

    with respect to the condition ∇

    This is incorrect. It should read

    with respect to the connection ∇

99. On page 434, line 1, we now have

    is said to an ...

    This is incorrect. It should read

    is said to be an ...

100. On page 434, item number 2, line -2, we now have

    is said to *Lorentzian*

This is incorrect. It should read

is said to be *Lorentzian*

101. On page 435, equation (5.10.15) currently reads

$$\cdots = \cdots - \frac{1}{2}\left(S^{\ell}{}_{[ik}T_{|\ell|_{i_2\cdots i_r]}} + \cdots + S^{\ell}{}_{[i_rk}T_{i_1\cdots i_{r-1}]\ell}\right),$$

This is incorrect. It should read (note indices)

$$\cdots = \cdots - \frac{1}{2}\left(S^{\ell}{}_{[i_1k}T_{|\ell|_{i_2\cdots i_r]}} + \cdots + S^{\ell}{}_{[i_rk}T_{i_1\cdots i_{r-1}]\ell}\right),$$

102. On page 435, item number 3, lines 1–2, now reads

$$\cdots = X^{\ell}R^{i}{}_{\ell jk}$$

This is incorrect. It should read (note subscript j in R)

$$\cdots = X^{\ell}R^{i}{}_{\ell jk}$$

103. On page 435, item number 3, line 4, we now have

$$2\nabla_{[i}\nabla_{j]}Y_k + \nabla_{\ell}Y_iS^{\ell}{}_{ij} = -Y_{\ell}R^{\ell}{}_{kij}$$

This is incorrect. It should read (note subscript k in second term)

$$2\nabla_{[i}\nabla_{j]}Y_k - \nabla_{\ell}Y_kS^{\ell}{}_{ij} = -Y_{\ell}R^{\ell}{}_{kij}$$

104. On page 435, equation (5.10.16), we now have

$$2\nabla_{[i}\nabla_{i]}T^{k}_{\ell m} + \nabla_nT^{k}_{\ell m}S^{n}_{ij} = \ldots$$

This is incorrect. It should read (note subscripts on first ∇, and change of sign)

$$2\nabla_{[i}\nabla_{j]}T^{k}_{\ell m} - \nabla_nT^{k}_{\ell m}S^{n}_{ij} = \ldots$$

105. On page 435, equations (5.10.17) and (5.10.18) presently read

$$S^{i}{}_{(jk)} = 0, \quad R^{i}{}_{j(k\ell)} = 0, \quad R^{i}{}_{[jk\ell]} = S^{i}{}_{[jk;\ell]} + S^{i}{}_{m[j}S^{m}_{k\ell]},$$

$$R^{i}{}_{j[kl;m]} + R^{i}{}_{jn[k}S^{n}_{\ell m]} = 0.$$

They are incorrect. They should read (note the sign changes on the 3rd and 4th equations)

$$S^i{}_{(jk)} = 0, \quad R^i{}_{j(k\ell)} = 0, \quad R^i{}_{[jk\ell]} = -S^i{}_{[jk;\ell]} + S^i{}_{m[j}S^m_{k\ell]},$$

$$R^i{}_{j[kl;m]} - R^i{}_{jn[k}S^n_{\ell m]} = 0.$$

106. On page 436, item number 3, we now have

> The *Laplacian* of a scalar invariant f is given by $\Delta f = g^{ij}\nabla_i\nabla_i f = \cdots$

This is incorrect. It should read (note the subscript on the second ∇)

> The *Laplacian* of a scalar invariant f is given by $\Delta f = g^{ij}\nabla_i\nabla_j f = \cdots$

107. On page 436, equation (5.10.19), we now have

$$\begin{aligned} R_{ijk\ell} &= [j\ell,i]_{,k} - [jk,i]_{,\ell} + [i\ell,m]\,\Gamma^m_{jk} - [rk,m]\Gamma^m_{j\ell} \\ &= \tfrac{1}{2}(g_{i\ell,ik} + g_{jk,i\ell} - g_{i\ell,i\ell} - g_{ik,j\ell}) \\ &\qquad + g^{mn}([i\ell,m][jk,n] - [ik,m][i\ell,n]). \end{aligned}$$

This is incorrect. It should read (there are changes in all three lines)

$$\begin{aligned} R_{ijk\ell} &= [j\ell,i]_{,k} - [jk,i]_{,\ell} + [i\ell,m]\,\Gamma^m_{jk} - [ik,m]\Gamma^m_{j\ell} \\ &= \tfrac{1}{2}(g_{i\ell,jk} + g_{jk,i\ell} - g_{j\ell,ik} - g_{ik,j\ell}) \\ &\qquad + g^{mn}([i\ell,m][jk,n] - [ik,m][j\ell,n]). \end{aligned}$$

108. On page 437, equation (5.10.24), we now have

$$\tilde{T}_{i_1\cdots i_r} = T_{j_1\cdots j_r}\mathrm{O}_{i_1 j_r}\cdots\mathrm{O}_{i_r j_r}$$

This is incorrect. It should read (notice the second subscript on the first O term)

$$\tilde{T}_{i_1\cdots i_r} = T_{j_1\cdots j_r}\mathrm{O}_{i_1 j_1}\cdots\mathrm{O}_{i_r j_r}$$

109. On page 439, note number 11, lines 1 and 3 presently have

$$x^2 + y^2 + z^2 + = r^2 \ \ldots\ldots\ U = (0,\pi)\times(0,\pi)\times(0,2\pi)$$

These are incorrect. They should be

$$x^2 + y^2 + z^2 = r^2 \ \ldots\ldots\ U = (0,\pi)\times(0,2\pi)$$

110. On page 439, item number 11, last bullet, the Ricci scalar reads

$$R = -2r^2$$

This is incorrect. It should read

$$R = -2r^{-2}$$

111. On page 442: equation (5.11.12), $\mathbf{e}_x$, $\mathbf{e}_y$, and $\mathbf{e}_z$ should be replaced with $\mathbf{a}_x$, $\mathbf{a}_y$, and $\mathbf{a}_z$.

112. On page 443: equation (5.11.17), $\mathbf{e}_r$, $\mathbf{e}_\theta$, and $\mathbf{e}_z$ should be replaced with $\mathbf{a}_r$, $\mathbf{a}_\theta$, and $\mathbf{a}_z$.

113. On page 443, equation (5.11.20), the A_r should be replaced with E_r.

114. On page 456, second table, heading, third column, replace "$cotx$" with "$\cot x$".

115. On page 473, first line after equation (6.5.2), replace "us" with "is".

116. On page 476, section 6.7.1, the definition

$$\tanh z = \frac{e^z - e^{-z}}{e^z + e^z}$$

is incorrect. It should say

$$\tanh z = \frac{e^z - e^{-z}}{e^z + e^{-z}}$$

117. On page 488, line -4, replace "if $x \geq 0$ and $\alpha \geq 0$" with "if $x \geq 0$ and $\alpha > 0$"

118. On page 488, line -2, delete the line "with $\alpha > -1$".

119. On page 492, section 6.10.9, change the notation. Instead of $P_0(\alpha, \beta)$, $P_1(\alpha, \beta), \ldots$ on the left hand side of the equations, use $P_0^{(\alpha,\beta)}(x)$, $P_1^{(\alpha,\beta)}(x)$, $\ldots$.

120. Page 499, section 6.13.5, last line

$$\sim \frac{2}{\sqrt{\pi}} \frac{e^{-z^2}}{2z} \left(1 - \frac{1}{z^2} + \frac{6}{z^4} - \frac{15}{8\,z^6} + \ldots\right)$$

This is incorrect. It should say

$$\sim \frac{2}{\sqrt{\pi}} \frac{e^{-z^2}}{2z} \left(1 - \frac{1}{2z^2} + \frac{3}{4z^4} - \frac{15}{8z^6} + \ldots\right)$$

121. Page 507, section 6.16.1, the present title is

DEFINITION OF THE ψ-FUNCTION

This is incorrect. It should say

DEFINITION OF THE F-FUNCTION

122. Page 520, line -3, replace $cos(\nu\theta)$" with $\cos(\nu\theta)$".

123. Page 533, last line on the page, $S(f,t)$ should be $S(f,x)$.

124. Page 556, item number 6, left hand column, instead of being "-1", this should be "0".

125. Page 560–564: In the Laplace Transform tables the s's and t's are swapped. The problem can be fixed by doing a global change from t to s in column 1 and from s to t in column 2, and replacing $f(t)$ at the top of column 1 with $F(s)$, and vice-versa.

    For example, number 9 should be $f(t) = e^{at}$ is equivalent to $F(s) = \frac{1}{s-a}$.

126. Page 583, equation (7.2.17), last line. We presently have

$$= \frac{2}{(\beta-\alpha)_t} \sinh\left[\frac{(\beta-\alpha)t}{2}\right] e^{(\alpha+\beta)t/2}$$

    This is incorrect (notice the t in the denominator). It should say

$$= \frac{2}{(\beta-\alpha)t} \sinh\left[\frac{(\beta-\alpha)t}{2}\right] e^{(\alpha+\beta)t/2}$$

127. Page 596,

    (a) replace all bullets on page with enumerated indentation (i.e., "(a)", "(b)", and "(c)" (for notes 1, 2, 3) and "(a)" and "(b)" (for note 4))

    (b) note 4, second bullet (now "(b)"), replace "step 1" with "step (a)".

128. Page 597, note 1, bullet 1, last line, replace "$\frac{1}{4} < 0.4 < \frac{1}{2}$" with "$\frac{1}{4} < 0.4 < \frac{3}{4}$".

129. Page 628, section 7.10.2,

    - Line 4, change "$\mathbf{y} = \mathbf{X}\beta + \epsilon$" to "$\mathbf{y} = \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\epsilon}$".
    - Equation (7.10.7), the left hand sides of the equations should be "$\mathbf{y}$", "$\boldsymbol{\beta}$", and "$\boldsymbol{\epsilon}$", not "$\mathbf{y}$", "β", and "ϵ".
    - In note numbers 3 and 4, change the three occurrences of "$\hat{\beta}$" to "$\hat{\boldsymbol{\beta}}$".
    - In note number 6, change "$\hat{\beta}$" to "$\hat{\boldsymbol{\beta}}$" and change "$\mathbf{X}$" to "$\mathbf{x}$".

130. Page 629, item number 10,

    - Line 1, change "x_0" to "$\mathbf{x}_0$".
    - Line 6, change all three occurrences of "$\mathbf{X}_0$" to "$\mathbf{x}_0$".
    - Line 6, replace "$\hat{y} = \mathbf{X}^{\mathrm{T}}\hat{\beta}$" with "$\hat{y} = \mathbf{x}^{\mathrm{T}}\hat{\boldsymbol{\beta}}$".

131. Page 651, section 7.12.6, first equation on page is now

$$B(n, x; , p) = \sum_{k=0}^{x} \binom{n}{k} p^k (1 = p)^{n-k}$$

which is incorrect. It should be

$$B(n, x; p) = \sum_{k=0}^{x} \binom{n}{k} p^k (1 - p)^{n-k}$$

132. Page 660, section 7.13.3, it presently says

> Let $S(t)$ represent a signal to be recovered, let $N(t)$ represent noise, and let $Y(t) = S(t) + N(t)$ represent the observable. A prediction of the signal is
>
> $$S_p(t) = \int_0^\infty K(z) Y(t - z)\, dz$$
>
> where $K(z)$ is a filter. The mean square error is $\mathrm{E}\left[(S(t) - S_p(t))^2\right]$
> ...

This is incorrect. It should say (note $S \to X$):

> Let $X(t)$ represent a signal to be recovered, let $N(t)$ represent noise, and let $Y(t) = X(t) + N(t)$ represent the observable. A prediction of the signal is
>
> $$X_p(t) = \int_0^\infty K(z) Y(t - z)\, dz$$
>
> where $K(z)$ is a filter. The mean square error is $\mathrm{E}\left[(X(t) - X_p(t))^2\right]$
> ...

133. Page 675, first line, we now have "$|p_n - p| \leq b - a/2^m$" which is incorrect. This should be "$|p_n - p| \leq (b - a)/2^m$".

134. Page 675, Horner's algorithm, second line, we now have "$z = P'(x_0)$," which is incorrect. This should be "$z = P'(x_0))$,".

135. Page 681, Algorithm for clamped cubic splines,

- Statement 2: replace "a_0" and "a_n" with "α_0" and "α_n".
- Statement 4: replace "u_0" with "μ_0".

136. Page 688, middle of page, we now have

$$\begin{bmatrix} a_1 & b_2 & 0 & \cdots & 0 \\ b_2 & a_2 & b_3 & & 0 \\ 0 & b_3 & a_3 & & 0 \\ \vdots & & & & \vdots \\ 0 & 0 & \cdots & a_{j-2} & b_{j-1} \\ 0 & 0 & \cdots & b_{j-1} & a_{j-1} \end{bmatrix} \text{ and } \begin{bmatrix} a_j & b_{j+1} & 0 & \cdots & 0 \\ b_{j+1} & a_{j+1} & b_{j+2} & & 0 \\ 0 & b_{j+2} & a_{j+2} & & 0 \\ \vdots & & & & \vdots \\ 0 & 0 & \cdots & a_{n-1} & b_n \\ 0 & 0 & \dots & b_n & a_n \end{bmatrix}$$

which is incorrect. This should be (note the removal of one set of vertical dots in each matrix)

$$\begin{bmatrix} a_1 & b_2 & 0 & \cdots & 0 \\ b_2 & a_2 & b_3 & & 0 \\ 0 & b_3 & a_3 & & 0 \\ \vdots & & & & \\ 0 & 0 & \cdots & a_{j-2} & b_{j-1} \\ 0 & 0 & \cdots & b_{j-1} & a_{j-1} \end{bmatrix} \text{ and } \begin{bmatrix} a_j & b_{j+1} & 0 & \cdots & 0 \\ b_{j+1} & a_{j+1} & b_{j+2} & & 0 \\ 0 & b_{j+2} & a_{j+2} & & 0 \\ \vdots & & & & \\ 0 & 0 & \cdots & a_{n-1} & b_n \\ 0 & 0 & \dots & b_n & a_n \end{bmatrix}$$

137. Page 710:

- Second line after equation (8.3.2): we currently have "$y \in S$". This is incorrect, it should be "$(x, y) \in S$".
- Fifth line after equation (8.3.2): we currently have "$y_j = b + jk$". This is incorrect, it should be "$y_j = c + jk$".

138. Page 711:

- First equation on the page, the right hand side is presently "$h^2 f(x_i, y_j)$". This is incorrect, it should be "$-h^2 f(x_i, y_j)$".
- First line after the first equation on the page contains "$j = 0, 1, \ldots, m$". This is incorrect, it should be "$j = 1, 2, \ldots, m-1$".
- Last line before the large displayed equation contains "$w_i = u(P_i)$". This is incorrect, it should be "$f_\ell = f(P_\ell)$".
- Large displayed equation is presently

$$\begin{array}{lrcl} P_1: & 4w_1 - w_2 - w_4 & = & w_{0,3} + w_{1,4} \\ P_2: & 4w_2 - w_3 - w_1 - w_5 & = & w_{2,4} \\ P_3: & 4w_3 - w_2 - w_6 & = & w_{4,3} + w_{3,4} \\ P_4: & 4w_4 - w_5 - w_1 - w_7 & = & w_{0,2} \\ P_5: & 4w_5 - w_6 - w_4 - w_2 - w_8 & = & 0 \\ P_6: & 4w_6 - w_5 - w_3 - w_9 & = & w_{4,2} \\ P_7: & 4w_7 - w_8 - w_4 & = & w_{0,1} + w_{1,0} \\ P_8: & 4w_8 - w_9 - w_7 - w_5 & = & w_{2,0} \\ P_9: & 4w_9 - w_8 - w_6 & = & w_{3,0} + w_{4,1} \end{array}$$

This is incorrect. It should say:

$$\begin{array}{lrcl}
P_1: & 4w_1 - w_2 - w_4 & = & w_{0,3} + w_{1,4} - h^2 f_1 \\
P_2: & 4w_2 - w_3 - w_1 - w_5 & = & w_{2,4} - h^2 f_2 \\
P_3: & 4w_3 - w_2 - w_6 & = & w_{4,3} + w_{3,4} - h^2 f_3 \\
P_4: & 4w_4 - w_5 - w_1 - w_7 & = & w_{0,2} - h^2 f_4 \\
P_5: & 4w_5 - w_6 - w_4 - w_2 - w_8 & = & 0 - h^2 f_5 \\
P_6: & 4w_6 - w_5 - w_3 - w_9 & = & w_{4,2} - h^2 f_6 \\
P_7: & 4w_7 - w_8 - w_4 & = & w_{0,1} + w_{1,0} - h^2 f_7 \\
P_8: & 4w_8 - w_9 - w_7 - w_5 & = & w_{2,0} - h^2 f_8 \\
P_9: & 4w_9 - w_8 - w_6 & = & w_{3,0} + w_{4,1} - h^2 f_9
\end{array}$$

139. Page 720, last line before **Present Value**, presently has "$9 \rightarrow \infty$". This is incorrect, it should be "$q \rightarrow \infty$".

140. Page 720, line 10, we now have "on page 726.)". This is incorrect, it should be "on page 723.)".

141. Page 735, the two tables are presently

To obtain	Multiply	By
Inches	Centimeters	3.937008×10^{-1}
Feet	Meters	3.280840
Yards	Meters	1.093613
Miles	Kilometers	0.6213712
Ounces	Grams	3.527396×10^{-2}
Pounds	Kilograms	2.204623
Gallons (US)	Liters	0.2641721
Fluid ounces	Milliliters (cc)	3.381402×10^{-2}
Square inches	Square centimeters	0.1550003
Square feet	Square meters	10.76391
Square yards	Square meters	1.195990
Cubic inches	Milliliters (cc)	6.102374×10^{-2}
Cubic feet	Cubic meters	35.31467
Cubic yards	Cubic meters	1.307951

To obtain	Multiply	By
Microns	Mils	25.4
Centimeters	Inches	2.540000
Meters	Feet	0.3048000
Meters	Yards	0.9144000
Kilometers	Miles	1.609344
Grams	Ounces	28.34952
Kilograms	Pounds	0.4535924
Liters	Gallons (US)	3.785412
Milliliters (cc)	Fluid ounces	29.57353
Square centimeters	Square inches	6.451600
Square meters	Square feet	0.09290304
Square meters	Square yards	0.8361274
Milliliters (cc)	Cubic inches	16.38706
Cubic meters	Cubic feet	2.831685×10^{-2}
Cubic meters	Cubic yards	0.7645549

These are correct as written, but several users mis-read the column captions. I recommend that the order of the columns be changed, and that the terms in exponential notation be changed, to obtain:

Multiply	By	To obtain
Centimeters	0.3937008	Inches
Meters	3.280840	Feet
Meters	1.093613	Yards
Kilometers	0.6213712	Miles
Grams	0.03527396	Ounces
Kilograms	2.204623	Pounds
Liters	0.2641721	Gallons (US)
Milliliters (cc)	0.03381402	Fluid ounces
Square centimeters	0.1550003	Square inches
Square meters	10.76391	Square feet
Square meters	1.195990	Square yards
Milliliters (cc)	0.06102374	Cubic inches
Cubic meters	35.31467	Cubic feet
Cubic meters	1.307951	Cubic yards

Multiply	By	To obtain
Mils	25.4	Microns
Inches	2.540000	Centimeters
Feet	0.3048000	Meters
Yards	0.9144000	Meters
Miles	1.609344	Kilometers
Ounces	28.34952	Grams
Pounds	0.4535924	Kilograms
Gallons (US)	3.785412	Liters
Fluid ounces	29.57353	Milliliters (cc)
Square inches	6.451600	Square centimeters
Square feet	0.09290304	Square meters
Square yards	0.8361274	Square meters
Cubic inches	16.38706	Milliliters (cc)
Cubic feet	0.02831685	Cubic meters
Cubic yards	0.7645549	Cubic meters

142. On page 746, Optimization languages, "AMPLE" should be "AMPL"

143. On page 752, Maria Agnesi, the equation online 6 is incorrect. Presently we have "$y = \frac{a\sqrt{a-x}}{\sqrt{a}}$". This should be replaced by "$y = \pm\frac{a\sqrt{a-x}}{\sqrt{x}}$".

144. Back cover, last line of text is now "simple complex mathematical problems". This should be changed to "simple or complex mathematical problems".