On page 451, an example is given of Richardson extrapolation applied to Simpson's rule. When a good answer is not achieved the author concludes that "we do not recommend this procedure." Later he praises Romberg integration as not being a Richardson extrapolation, contrary to the thinking of other authors.

On page 529, the author suggests that the simplest types of second-order ordinary differential equations are the most common in practice. It is true that simple types occur frequently in textbooks. One fears that the future computer scientist will be misled by such a remark since he will have no way of knowing that problems of weather prediction, modelling of oil reservoir behavior, and of nuclear reactors, which have been significant computer challenges, have not involved particularly simple types of equations.

However it is all too likely that such challenging problems will not be attempted by graduates of the standard computer science program unless they learn the necessary science and mathematics. To do this they must complete a different degree.

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5[7.95, 7.100].–I. S. Gradshteyn and I. M. Ryzhik, *Table of Integrals, Series and Products*, Academic Press, New York, 1980, xlv + 1248 pp., 23 cm. Price $19.50. (Corrected and enlarged edition prepared by: Allan Jeffrey, incorporating the fourth edition prepared by: Yu. V. Geronimus and M. Yu. Tseytlin, translated from the Russian by Scripta Technica, Inc., and edited by Allan Jeffrey.)

The history of this work dates back to the 1943 tables (in Russian) by I. M. Ryzhik. It was reviewed in [1] and reviews of subsequent editions and notices of errata are covered in [2]–[17]. In 1957 there appeared a translation of the Russian third edition into parallel German and English text. It is an improved and expanded version of the 1943 edition and is authored by I. S. Gradshteyn and I. M. Ryzhik. This item was reviewed in [2] and errata are noted in [2]–[5], [10]. In 1965, the immediate forerunner of the present volume appeared. It represents an expanded version of the third edition with many new sections added. This was reviewed in [6] and errata notices are given in [7]–[9], [11]–[17].

The first 1080 pages of the 1965 and present editions are identical except for corrected errata and for some new errata introduced in place of the old errata. Yet much of the 1965 errata remains. Indeed two errata noted in [3] are in the 1965 and 1980 editions. Pages xxiii–xlv are also the same in both editions. Pages i–xxii are slightly different owing principally to the table of contents which describes the 73 pages of new material, (pp. 1081–1153) in the present edition. The list of bibliographic references used in preparation of text is slightly enlarged, but the classified supplementary references are the same. The bibliographies are seriously deficient in view of a large amount of significant material which has appeared in the last fifteen years.

On p. ix of the present edition there is an acknowledgement to 74 workers who supplied the editor with corrections. It is incredible but true that not a single worker who reported errata in the various issues of *Mathematics of Computation* is mentioned, and as noted above many errors in the 1965 edition still remain in the 1980 edition. A list of all errata known to me is appended to this review.

The reviewer of the 1965 edition [6] noted a number of textual errors which might be attributed to translation difficulties. These same criticisms apply to the present edition as no changes have been made. Along this same line, I would add that use of the words 'degenerate hypergeometric function' to describe the confluent hypergeometric function, pp. 1057–1068, Section 9.2, in both the 1965 and 1980 editions is ridiculous. Also the definition given in 9.201 is incorrect.

The photographic work done to produce the present volume is excellent.

Since a general description of the first 1080 pages is provided in previous reviews [1], [2], [6], it is sufficient to consider only the 73 pages of new material which is divided into eight chapters as follows. Chapter 10–Vector Field Theory, pp. 1081–1091; Chapter 11–Algebraic Inequalities, pp. 1093–1096; Chapter 12–Integral Inequalities, pp. 1097–1101; Chapter 13–Matrices and Related Results, pp. 1103–1107; Chapter 14–Determinants, pp. 1108–1111; Chapter 15–Norms, pp. 1114–1124; Chapter 16–Ordinary Differential Equations, pp. 1126–1140; and Chapter 17–Fourier and Laplace Transforms, pp. 1142–1153. The chapter titles are indicative of the material contained therein. For instance, Chapter 10 defines the various properties of vectors in three dimensions such as dot and cross product and their derivatives. The operators grad, div, and curl are defined and their properties are delineated. There are sections on orthogonal curvilinear coordinates and vector integral theorems. Chapter 11 lists inequalities of the kind like Cauchy-Schwarz (on p. 1093 the name Buniakowski is also attached), Minkowski and Hölder are given. Mean value theorems and integral inequalities analogous to the inequalities in Chapter 11 are noted. Chapters 13–17 are self-explanatory. I do not see the point of any of this added material. It is woefully inadequate and there are other thorough and well informed sources, sources not listed in the bibliography. An attempt to cover a subject like Ordinary Differential Equations in 15 pages is preposterous. Similar remarks pertain to Chapter 17. I have not made a thorough check, but I would suppose that all of the entries in Chapter 17 will be found elsewhere in the volume. On p. 1142, the definition of the Laplace transform is defective in that nothing is said about restricting the growth properties of the function $f(x)$.

The tome contains a wealth of valuable and useful information, but the editing and attention given to errata is not of the quality the volume merits.

Y. L.

1. *Math. Comp.*, v. 1, 1945, pp. 442–443.
2. *Math. Comp.*, v. 14, 1960, pp. 381–382.
3. *Math. Comp.*, v. 14, 1960, pp. 401–403.
4. *Math. Comp.*, v. 17, 1963, p. 102.
5. *Math. Comp.*, v. 20, 1966, p. 468.
6. *Math. Comp.*, v. 20, 1966, pp. 616–619.
7. *Math. Comp.*, v. 21, 1967, pp. 293–294.
8. *Math. Comp.*, v. 22, 1968, pp. 903–907.

9. *Math. Comp.*, v. 23, 1969, pp. 468–469, 891–892.
10. *Math. Comp.*, v. 24, 1970, p. 241.
11. *Math. Comp.*, v. 25, 1971, p. 200.
12. *Math. Comp.*, v. 26, 1972, pp. 305, 599.
13. *Math. Comp.*, v. 27, 1973, pp. 451–452.
14. *Math. Comp.*, v. 30, 1976, p. 899.
15. *Math. Comp.*, v. 31, 1977, p. 614.
16. *Math. Comp.*, v. 32, 1978, p. 318.
17. *Math. Comp.*, v. 33, 1979, p. 433.
18. R. G. Medhurst & J. H. Roberts, "Evaluation of the integral $I_n(b) = (2/\pi)\int_0^\infty(\sin x/x)^n \cdot \cos bx\, dx$," *Math. Comp.*, v. 19, 1965, pp. 113–117.
19. R. Thompson, "Evaluation of $I_n(b) = (2/\pi)\int_0^\infty(\sin x/x)^n \cos bx\, dx$ and of similar integrals," *Math. Comp.*, v. 20, 1966, pp. 330–332, 625. See also *Math. Comp.*, v. 23, 1969, p. 219.
20. H. E. Fettis, "More on the integral $I_n(b) = (2/\pi)\int_0^\infty(\sin x/x)^n \cos bx\, dx$," *Math. Comp.*, v. 21, 1967, pp. 727–730.
21. W. Sollfrey, "On a Bessel function integral," *SIAM Rev.*, v. 9, 1967, pp. 586–589.

Errata

Page	*Formula*	
2	0.131	*For* $A_4 = 19/80$ *read* $A_4 = 19/120$.
27	1.331.2	Delete coefficient sh x in first equation.
32	1.361.3	Multiply right side by $1/2$.
36	1.414.2	*For* $-n^2 \sum_{k=1}^{\infty}$ *read* $-n \sum_{k=1}^{\infty}$.
37	1.434	The left side should read $\cos^2 x$.
38	1.442.4	Right side should read $$\frac{\pi}{4}\left[0 < x < \pi/2\right], \quad -\frac{\pi}{4}\left[\pi/2 < x < \pi\right].$$
38	1.443.1	Delete $(-1)^k$.
39	1.444.6	*For* $k = 1$ *read* $k = 0$.
294	3.248.1	Right side should read $$\frac{1}{\nu}B\left(\frac{\mu}{\nu}, \frac{1}{2} - \frac{\mu}{\nu}\right)\left[\operatorname{Re}\nu > \operatorname{Re}2\mu > 0\right].$$
326	3.411.19 3.411.20	In each formula the definition for $\binom{n}{k}$ should read $\binom{n}{k} = n!/k!(n-k)!$.
354	3.531.1	*For* 1.171 953 619 4 *read* 1.171 953 619 3.
458	3.836.5	This formula should read $$I_n(b) = (2/\pi)\int_0^\infty \left(\frac{\sin x}{x}\right)^n \cos bx\, dx = n(2^{n-1}n!)^{-1}\sum_{k=0}^{[r]}(-1)^k\binom{n}{k}(n-b-2k)^{n-1},$$ where $$0 \leqslant b < n, \quad n \geqslant 1, \quad r = (n-b)/2,$$ and $[r]$ is the largest integer contained in r. The integral vanishes for $b \geqslant n$. For convenience, we have introduced a slight and obvious change in the notation used in the

Page	*Formula*	
		reference under review. The remark in the square bracket following the formula given there is not clear. The point is that in the above representation b can be replaced by $-b$. Then the left side remains the same. In the right side $n - b - 2k$ becomes $n + b - 2k$ and r becomes $(n + b)/2$. The parameter b is now taken as positive and $0 \leqslant b < n$ as before. On this same page formula 3.836.5 gives a representation for $$M_n(b) = (2/\pi)\int_0^\infty \left(\frac{\sin x}{x}\right)^n \frac{\sin bx}{x}\, dx = \int_0^b I_n(t)\, dt.$$ Thus the correct formula for $I_n(b)$ could easily have been found by differentiating $M_n(b)$ with respect to b. For further discussion on the evaluation of $I_n(b)$, see Medhurst and Roberts [18], Thompson [19], Fettis [20] and the references given in these sources.
516	4.117.5	*For* $+\operatorname{sh} a$ *read* $-\operatorname{ch} a$.
527	4.224.11	The formulae are incorrect for the cases $a^2 < 1$ and $a^2 > 1$. If $a > 0$, the integrals can be expressed as $\pi \ln(a/2) + 4G + 4S(b)$, where G is Catalan's constant, $$b = (1 - a)/(1 + a) \quad \text{and}$$ $$S(b) = \sum_{k=1}^{\infty} \frac{b^k}{k} \sum_{n=1}^{k} \frac{(-1)^{n+1}}{2n - 1}.$$ For alternative representations, see the concluding editorial note in [13].
527	4.224.13	*For* $2^k k!$ *read* $2^{2k}(k!)^2$.
578	4.358.3	The right side should read $$\Gamma(\nu)\mu^{-\nu}\left[\{\psi(\nu) - \ln \mu\}^3 + 3\zeta(2, \nu)\{\psi(\nu) - \ln \mu\} - 2\zeta(3, \nu)\right].$$
654	The right sides of the following equations should read as indicated.	
654	6.324.1	$(1 + \sin p^2 - \cos p^2)/4p$
654	6.324.2	$(1 - \sin p^2 - \cos p^2)/4p$
654	6.326.1	$(\pi/8)^{1/2}[S(p) + C(p) - 1] - (1 + \sin p^2 - \cos p^2)/4p$
654	6.326.2	$(\pi/8)^{1/2}[S(p) - C(p)] - (1 - \sin p^2 - \cos p^2)/4p$
722	6.646.3	The correct form of this formula is $$\int_b^\infty e^{-pt}\left(\frac{t - b}{t + b}\right)^{\nu/2} K_\nu\left[a(t^2 - b^2)^{1/2}\right] dt = \frac{\Gamma(\nu + 1)}{2sa^\nu}\left[x^\nu e^{-bs}\Gamma(-\nu, bx) - y^\nu e^{bs}\Gamma(-\nu, by)\right],$$ where $x = p - s$, $y = p + s$, $s = (p^2 - a^2)^{1/2}$, $\operatorname{Re}(p + a) > 0$, $\lvert\operatorname{Re}(\nu)\rvert < 1$. For the derivation of this formula, see W. Sollfrey [21].
722	6.647.3	Insert the factor $e^{-(a/2)\sinh t}$ on the right side.

Page	*Formula*	
722	6.648	*For* $\left(\frac{\alpha + \beta e^x}{\alpha e^x + \beta}\right)$ *read* $\left(\frac{\alpha + \beta e^x}{\alpha e^x + \beta}\right)^\nu$.
739	6.691.13	*For* $\pi/2$ *read* $\pi^2/4$.
837	7.374.7	*For* L_n^{n-m} *read* L_m^{n-m}.
841	7.388.6	*For* b^{2m} *read* b^{2m+1}.
841	7.391.3	*For* $\Gamma(\alpha + n + 1)$ *read* $\Gamma(\alpha + 1)$.
842	7.391.9	*For* $\Gamma(\sigma - \beta + m + 1)$ *read* $\Gamma(\sigma - \beta + m - n + 1)$.
843	7.411.1	*For* $L_{n+1}(t)$ *read* $L_{n+1}(t)/(n + 1)$.
843	7.411.5	*For* $L_k(x)$ *read* $L_k(x)/k!$.
920	8.174	*For* m (in two places) *read* n.
943	8.362.2	*For* z (in two places) *read* x.
947	8.373.2	*For* $1/2 \sin \pi x$ *read* $\pi/2 \sin \pi x$ and add $\ln 2$ to the right side.
948	8.375.1	*For* $p = 1, 2, 3, \ldots,$ *read* $p = 1, 2, 3, \ldots, q - 1$.
960	8.442	Add the comment: Omit the term containing the sum over m when $k = 1$.
961	8.446	Omit the term $\Sigma_{k=1}^{l} 1/k$ when $l = 0$.
976	8.521.4	*For* $+1/\sqrt{(2ki\pi - z)^2 + x^2 + y^2}$ *read* $-1/\sqrt{(2ki\pi - z)^2 + x^2 + y^2}$.
1005	8.732.2	*For* $(\nu + \mu)zQ_{\nu-1}^{\mu}(z)$ *read* $(\nu + \mu)Q_{\nu-1}^{\mu}(z)$.
1008	8.751.3	*For* $Q_{-n-3/2}^{\mu}(z)$ *read* $Q_{n-3/2}^{\mu}(z)$. *For* $z^{2n-\mu+3/2}$ *read* $\pi^{1/2}z^{-n-\mu-3/2}$.
1010	8.772.3	*For* $\left(\frac{z+1}{2}\right)^{-\nu}$ *read* $\left(\frac{z+1}{2}\right)^{\nu}$.
1013	8.792	*For* $\Sigma_{k=1}^{\infty}$ *read* $\Sigma_{k=0}^{\infty}$.
1015	8.812	The hypergeometric function should read $$F\left(\frac{m-n}{2}, \frac{m-n+1}{2}, \frac{1}{2} - n; \frac{1}{x^2}\right).$$
1019	8.831.3	*For* $2E\left(\frac{n-1}{2}\right)$ *read* $E\left(\frac{n-1}{2}\right)$.
1023	8.852.2	*For* 2^{-m} *read* 2^{-2m}.
1025	8.911.1	*For* $(2n)!/2n(n!)^2$ *read* $(2n)!/2^n(n!)^2$.
1028	8.923	*For* $\Sigma_{k=0}^{\infty}$ *read* $\Sigma_{k=1}^{\infty}$ and add $\pi x/2$ to the right side.
1028	8.924.1	*For* 9062.1 (in reference) *read* 9060.1.
1073	9.521.2	*For* [Re $z > 0$] *read* [Re $z < 0$].
1079	9.635.1	Add $4(-1)^{n+1}(3^{n-1} - 1)B_1$ to the right side.
1079	9.635.3	*For* $B_{2n+1}(\frac{1}{4})$ *read* $(B + \frac{1}{4})^{2n+1}$.
1095	Section 11.21	The formulas for $\cos r\theta$ and $\sin r\theta$ should read $$\cos r\theta = \frac{1}{2}(z^r + z^{-r}), \quad \sin r\theta = -\frac{i}{2}(z^r - z^{-r}).$$
1143–1146		In Section 17.13, the columns headed by $f(p)$ should be headed by $\bar{f}(p)$.