

Corrections and emendations for  
*Elementary Numerical Analysis, 3rd ed.*  
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Each emendation is preceded by an ‘e’.

Each correction is preceded by zero or more dots to indicate at which date this particular correction was communicated to the publisher, according to the following scheme: jul 1, 80 / . jan 20, 81 / .. mar 3, 81 /... may 24, 81 / : jun 3, 82 / :. mar 27, 84 / :: jun 6, 85 / ::. apr 12, 88 / ::: 12feb97.

Locations are identified by  $a/b/c$ , meaning **page**  $a$  / **paragraph** or **item**  $b$  / **line**  $c$ , with a negative  $b$  or  $c$  meaning a count from the bottom (of the page or the specified paragraph).

For example, both 5/5/1 and 5/−1/−3 refer to the same line, the one on page 5 that begins “This example was rigged...”

v//Chapter 2: SHOULD READ ... Polynomials

.:21/2display: SHOULD READ  $1 - \sum_{j=1}^n 2/(16j^2 - 1)$  ...

33//−1: auxilliary SHOULD READ auxiliary

36/4/4: SHOULD READ of **order**  $j$

e38/2/3: at most SHOULD BE BOLDFACE

e38/3/1: at least SHOULD BE BOLDFACE

.41/2/2: SHOULD READ ...  $(x - x_0)$

.41/2/3: INSERT  $(x - x_0)$  AFTER +

.43/Fig.2.1/Headings: REPLACE  $x_1$  BY  $x_i$

.45//−1: SHOULD READ (6.19)

.:50/2.4-2/display:  $p_{i+1,j-1}$  SHOULD READ  $p_{i+1,j}$

.54/Fig.2.3 text/2: dotted SHOULD READ dashed

:66/1/−2,−1: SHOULD READ for any limit point  $\xi$  of the sequence  $\xi^{(1)}, \xi^{(2)}, \dots$ , by the continuity of  $f^{(n)}(x)$ , and any such  $\xi$  must lie in  $[\lim x_0^{(r)}, \lim x_n^{(r)}] = [y_0, y_n]$ . This proves (i).

e66//5,6: SHOULD READ ... then find ...

70/flowchart/second-last box: DELETE COMMA BEFORE ]

...82/program/(statement 6)+1: REPLACE BY

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IF (ERROR .LE. XTOL) THEN
  IFLAG = 0
                                RETURN
END IF

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A QUICK FIX WOULD BE THE INSERTION OF

```
IFLAG = 0
```

AS THE FIRST EXECUTABLE STATEMENT.

..87/Example 3.2b/2: REPLACE solution of an equation of the form BY smallest positive zero of

.87/Example 3.2b/table: THE BODY OF THE TABLE SHOULD READ

.45000000	1.3279984E+01	.60000000	-1.1262310E+01
.43989500	2.3542378E+00	.66877546	1.2870500E+01
.43721231	1.2177630E-01	.64882229	2.2544956E+00
.43705785	3.7494997E-04	.64361698	1.1312314E-01
.43705737	3.5831818E-09	.64332721	3.2632512E-04
		.64332637	2.7358738E-09

WHILE THE HEADINGS (AND ALL ELSE) REMAIN AS IS.

110//6,-5: SHOULD READ ... to the number  $v$  of **variations in sign**

e156/4.2-8/: ADD THE FOLLOWING PARENTHETICAL REMARK (Answers depend crucially on just how rounding is carried out and how substitution is handled, as in SUBST or as in Algorithm 4.2. One can get anything, from the correct solution to a singular system.)

::159//4: SHOULD READ ... with symmetric positive definite coefficient ...

162/4/2: ... the  $p_k$ th equation ... SHOULD HAVE  $p$  IN ITALICS, NOT BOLDFACE

164/-1/4: ... matrix  $A$  ... SHOULD HAVE  $A$  IN ITALICS

164/-1/4,5: REPLACE , storing the factorization in an  $N \times N$  array  $W$ , and storing BY stored on entry in an  $N \times N$  array  $W$ . The program stores the factorization of  $A$  in the same work array  $W$ , and stores

.164/-1/-5: of the rows of  $A$  SHOULD HAVE  $A$  IN ITALICS

164//4 to -1: DELETE

..169/4.4-9/5,6: SHOULD READ

$$\ell_{ij} = (a_{ij} - \ell_{i1}d_{11}\ell_{j1} - \cdots - \ell_{i,j-1}d_{j-1,j-1}\ell_{j,j-1})/d_{jj} \quad \text{for } i > j$$

while

$$d_{jj} = a_{jj} - \ell_{j1}^2d_{11} - \cdots - \ell_{j,j-1}^2d_{j-1,j-1}$$

e172/2/4: PULL TOGETHER THE SUBSCRIPT  $p, w$

..179/Theorem 4.9/4: SHOULD READ unit roundoff  $nu \leq .01$ ,

..180//2: SHOULD READ as long as  $nr \leq .01$ .

..181/-2/-4: SHOULD END ... and (4.50a),

..192/Table 4.1/ THE THIRD COMPONENT OF EVERY OTHER VECTOR SHOULD BE MULTIPLIED BY  $-1$ .

..192/2/7: SHOULD READ

$$\dots = \lambda_1 \frac{\mathbf{u}^T \mathbf{y}_1 + \cdots}{\mathbf{u}^T \mathbf{y}_1 + \cdots}$$

194,195/Program/ SHOULD HAVE BEEN MUCH DARKER. SIMILARLY ON PAGES 258, 263-4, 265-5, 281-2, 285, 316, 317, 323, 324, 325, 326-7, 343-4, 377

194/Program/: IF (IFLAG .EQ. 0) SHOULD READ IF (IFLAG .EQ. 0)

..205//6: REPLACE Exercise 4.7-11 BY Exercise 4.7-8

..205/2/2,3: REPLACE  $p_{i-1}$  BY  $p_i$  (THREE TIMES ALTOGETHER)

...206/4.8-15/1: AFTER Hermitian matrix INSERT , i.e., a matrix  $A$  satisfying  $A = A^H$ ,

:212/-1/2: SHOULD READ ... Example 5.3

:.214//2 REPLACE  $s_3 := t_{\max}$  BY  $(s_1, s_2, s_3) := (s_2, s_3, t_{\max})$   
 214/2/6: alright SHOULD READ alright  
 :.215/5.1-1/2: REPLACE  $+3$  BY  $-3(2x_1 + x_2)$   
 216//14: SHOULD READ ... with the *matrix*  $\mathbf{f}'(\mathbf{x})$  called ...  
 :.218//3: SHOULD READ choices  
 219/Algorithm/7: MOVE THE INITIAL \* A BIT TO THE LEFT AND CENTER IT ON THE LINE  
 ..221/3/6: INSERT ' AFTER FIRST  $\mathbf{f}$   
 :::231/3/3: SHOULD READ real symmetric and is positive definite, i.e., for all nonzero  
 ...231/4/5,7: REPLACE  $j > i$  BY  $j \geq i$   
 ...231/4/11: PREMULTIPLY THE SECOND  $\hat{D}$  BY  $(1 - \omega)$   
 :.236/2/-3,-2: SHOULD READ then we would be wasting time and effort if we were to construct  $p_{10}^*$ .  
 237/Example/6.2/1: SHOULD READ  $\tan(\pi/4)x$   
 .237/Example 6.2/6: SHOULD READ or  $0.004065 \leq \text{dist}_{\infty}(f, \pi_4)$ . ...  
 ...242/2/4: INSERT  $, x$  AFTER THE FIRST  $x_n$   
 :::242//3: SECOND  $n + 1$  should be  $n$   
 :::243/Figure/: IS WRONG FOR SMALL  $n$   
 e244/(6.19)/:SHOULD READ  $\|\Lambda_n^u\|_{\infty} = \frac{2^{n+1}}{en \ln(n)}(1 + o(1))$   
 e244/3/-1: SHOULD READ this kind; also, see Problem 6.1-15.)  
 e245//: ADD PROBLEM  
 6.1-15 (R.-Q. Jia) Prove that  $\|\Lambda_n^u\|_{\infty} \geq 2^n/[4n(n-1)]$  by estimating  $\Lambda_n^u(1 - 1/n)$  from below.  
 :::253/Property 3//1: SHOULD READ ... in  $(a, b)$  and some  $\alpha_k \neq 0$ .  
 :.267/1/-5: SHOULD READ  $f_n - p_4^*(x_n)$   
 .271/3/4: REPLACE piecewise continuous BY piecewise monotone  
 .272//5: SHOULD READ ...  $\{2e^{-ij\pi} - 2\} = -i\frac{2}{\pi}$  ...  
 .272/(6.51)/: SHOULD READ ...  $e^{-ijx_n}$   
 e274/2/3: SHOULD READ ... every  $1/24$  of a second, ...  
 .274/4/-1: SAME AS 271/3/4  
 275/Example 6.14/2: REPLACE the relevant quantities are BY  $c_r = \hat{f}_N(r) = \langle \mathbf{f}, \mathbf{w}^{(r)} \rangle$  with  $\mathbf{f} := (f(x_j))$ ,  
 $\mathbf{w}^{(r)} := (e^{imx_j}) = (\omega^{mj})$  and  
 275/Example 6.14/4: REPLACE BY Thus  $\omega^2 = \omega^{-1} = \bar{\omega}$ . Further  
 275/Example 6.14/-4: REPLACE BY Therefore  
 .275/Example 6.14/-2: SHOULD READ ...  $-\sqrt{3/4}\omega^{-2}] = -\frac{1}{3}\sqrt{3/4}$  ...  
 .276/3/-1: SAME AS 271/3/4  
 :.289//4,-5: REPLACE (6.79) or (6.80) BY (6.80) or (6.81)  
 e299/1/2: SHOULD READ ... twice, one gets (from Exercise 2.7-8)  
 :::307//first display: SHOULD READ  $(x - b)$

::311/1/-2: SHOULD READ  $2k + 1$   
 :::e311/-2/-5: PUT nonnegative INTO ITALICS  
 :::312//second display: SHOULD READ  $E^T = -$   
 :313//5: SHOULD READ ... Property 2 ...  
 :313//4,-8: SHOULD READ ... Sec. 6.3.  
 :.313//4: SHOULD READ Property 3  
 ::318//1: SHOULD READ (6.15)  
 .321/(7.50)/: REPLACE SECOND = BY +  
 :325/program/: DELETE STATEMENT LABELLED 4  
 :.326/(7.54b)/: REPLACE  $\frac{1}{2}$  BY  $\frac{a-b}{2}$   
 :.341/-2/-4: REPLACE  $h_k^{2k}$  BY  $h^{2k}$   
 ::345/7.7-4/: REPLACE EVERY  $h^2$  BY  $h^3$  AND EVERY  $h^4$  BY  $h^5$   
 ..345//1: END WITH )  
 356//3: DELETE THE EQUATION LABEL (8.23) . IT IS DUPLICATED ON PAGE 359.  
 ..364/3/2: INSERT - AFTER =  
 ..367/(8.38)/: SHOULD END ...  $C_n h^{p+1} + O(h^{p+2})$   
 ..367/1/(8.38)+3: SHOULD END ... the constant  $C_n$   
 ..367/1/(8.38)+4: SHOULD END ... on the number  
 ..367/1/(8.38)+5: SHOULD READ  $m$ . Therefore,  
 ..367/1/(8.39a): SHOULD END ...  $+ C_n h^{p+1} + O(h^{p+2})$   
 ..367/1/(8.39b): SHOULD END ...  $+ 2C_n (h/2)^{p+1} + O(h^{p+2})$   
 ..367/1/(8.39b)+3: SHOULD BEGIN  $2C_n (h/2)^{p+1}$  ...  
 :::371/2/2: SHOULD READ which the solution is output.  
 :::379/1/6: (8.43) SHOULD READ (8.44)  
 ::381/5,6: DELETE THE PARENTHETICAL STATEMENT and since  $\partial f/\partial y$  is bounded and nonvanishing by assumption,  
 ::381/9: DELETE ENTIRE LINE  
 ...382//7: SHOULD READ  $\gamma'_4 = -\frac{19}{720}$   
 ...389/1/9: SHOULD READ  $\frac{1}{3}h^3 y'''(\xi)$   
 ::393//2: SHOULD READ  $\sigma(\beta) = (\beta^2 + 4\beta + 1)/(-3)$   
 ...394/display/:SHOULD READ  $y_{n+1} = y_n + h(f_{n+1} + f_n)/2$   
 ..418/(9.21)/: SHOULD END ...  $+ c_3 x^3$   
 ..419/EXERCISES/: SHOULD BE NUMBERED 9.3-1, 9.3-2  
 ..419/Ex.9.3-1/-1: INSERT 2 AFTER =  
 :::419/Ex.9.3-2/: IT'S SILLY; THROW IT AWAY  
 e423/14./: REPLACE BY Dorn, W. S., and D. McCracken, *Numerical Methods with Fortran IV Case*

*Studies*, John Wiley, New York, 1972.

..430//: SHOULD READ Lebesgue function

e430/Matrix/: INSERT APPROPRIATELY Hermitian, 206 AND Hermitian of a, 142

e431/Polynomial forms:/: INSERT APPROPRIATELY Chebyshev, 258