S.C. Chapra
Applied Numerical Methods with MATLAB
Errata for First Edition
(Last updated: 2/6/06)

p. 13; Prob. 1.6 Derivatives in equations should be with respect to time:

$$\frac{d(Ay)}{dt} = 3Q\sin^2(t) \quad -Q$$

$$\frac{dy}{dt} = 3\frac{Q}{A}\sin^2(t) - \frac{Q}{A}$$

p. 45; Third line from the top should be

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y = cos(t);
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p. 64; Change paragraphs at bottom of page to:

In general, for computer tools that use **32-**bit word size, fractional numbers, called *floating point numbers* in computing jargon, can be expressed to about seven base-10 digits of precision. Thus, π can be expressed as 3.141593. For tools using **64-**bit words, the precision increases to about fifteen base-10 digits. Thus, π would be expressed as 3.14159265358979. Note that **64-**bit precision is standard in MATLAB. This is sometimes called *double precision*.

Range. There are finite ranges of values that the computer can represent. For computer tools that use 16-bit word size, the range of integers is typically from –32,768 to 32,767. For those using 32-bit word size, these increase to –2,147,483,647 to 2,147,483,647**, and for 64-bit word size to** $\mathbf{-9.22\times10^{18}}$ **to** $\mathbf{9.22\times10^{18}}$. For floating point numbers, the ranges are 10^{-38} to 10^{38} and 10^{-308} to 10^{308} for **32-**bit and **64-**bit word size, respectively.

p. 69; Eq. (4.13) change $f'(x_i)/2!$ to $f''(x_i)/2!$

$$f(x_{i+1}) = f(x_i) + f'(x_i)h + \frac{f''(x_i)}{2!}h^2 + \frac{f^{(3)}(x_i)}{3!}h^3 + \cdots + \frac{f^{(n)}(x_i)}{n!}h^n + R_n$$

p. 94; The following changes should be made for some of the formulas on this page

$$E_a^0 = \frac{x_u^0 - x_l^0}{2} = \frac{\Delta x^0}{2} \text{ change to} \rightarrow E_a^0 = x_u^0 - x_l^0 = \Delta x^0$$

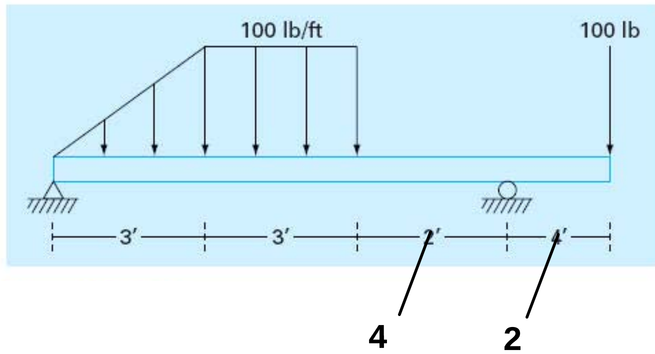
$$E_a^1 = \frac{\Delta x^0}{4} \text{ change to} \rightarrow E_a^1 = \frac{\Delta x^0}{2}$$

$$E_a^n = \frac{\Delta x^0}{2^{n+1}} \text{ change to} \rightarrow E_a^n = \frac{\Delta x^0}{2^n}$$

$$n = 1 + \frac{\log\left(\Delta x^0 / E_{a,d}\right)}{\log 2} = 1 + \log_2\left(\frac{\Delta x^0}{E_{a,d}}\right) \text{ change to} \rightarrow \ n = \frac{\log\left(\Delta x^0 / E_{a,d}\right)}{\log 2} = \log_2\left(\frac{\Delta x^0}{E_{a,d}}\right)$$

$$n = 1 + \log_2\left(\frac{150/0.5859}{2}\right) = 8 \text{ change to} \rightarrow \ n = \log_2\left(\frac{150}{0.5859}\right) = 8$$

p. 99; Fig. P5.5



p. 122; Prob. 6.19; change units of k_2 = 40 g/(s^2 m$^{0.5}$)

p. 122; Prob. 6.20; change equation to

$$y = (\tan\theta_0)x - \frac{g}{2v_0^2\cos^2\theta_0}x^2 + y_0$$

where y_0 = the initial elevation.

p. 137; Prob. 7.7; Next to last equation, Change $F_{2,h}$ to $F_{3,h}$.

$$\sum F_H = 0 = -F_2 - F_3\cos 60° + F_{3,h}$$

p. 147; Middle of page, equation should be (change a_{21} to a_{22})

$$\left(a_{22} - \frac{a_{21}}{a_{11}}a_{12}\right)x_2 + \cdots + \left(a_{2n} - \frac{a_{21}}{a_{11}}a_{1n}\right)x_n = b_2 - \frac{a_{21}}{a_{11}}b_1$$

p. 205; Second equation in Sec. 12.3.2

$$\frac{\partial S_r}{\partial a_1} = -2\sum\left[(y_i - a_0 - a_1x_i)x_i\right]$$

p. 210; Table 12.5 change heading of third column to $a_0 + a_1x_i$

p. 217; Change polynomial representation at bottom of page to

$$f(x) = p_1 x^n + p_2 x^{n-1} + \cdots + p_n x + p_{n+1}$$

p. 233; Prob. 13.7, Equation should be (change 0 to *o*)

$$o = f_3(T) + f_1(c)$$

p. 244; Third equation from the bottom, change 0 in denominator to 1.

$$f[x_2, x_1] = \frac{1.386294 - 0}{4 - 1} = 0.4620981$$

p. 263; In 10th line of function, change `int` to `fix`

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iM = fix((iL + iU) / 2);
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p. 264; Eq. (15.7) change f_i after equal sign to f_{i+1}

$$f_i + b_i(x_{i+1} - x_i) + c_i(x_{i+1} - x_i)^2 = f_{i+1} + b_{i+1}(x_{i+1} - x_{i+1}) + c_{i+1}(x_{i+1} - x_{i+1})^2$$

p. 290; Table 16.1 caption change "x = 0 to 8" to "x = 0 to 0.8"

p. 302; In equation, change 40 to 72,

$$T(x, y) = 2xy + 2x - x^2 - 2y^2 + 72$$

p. 315; change Eqs. (17.18) to (17.20) at bottom of page to

$$x = a_1 + a_2 x_d \tag{17.18}$$

$$a = a_1 + a_2(-1) \tag{17.19}$$

$$b = a_1 + a_2(1) \tag{17.20}$$

p. 316; change Eq. (17.21) to

$$a_1 = \frac{b + a}{2} \qquad \text{and} \qquad a_2 = \frac{b - a}{2} \tag{17.21}$$

p. 343; Prob. 18.2(c) to

(c) Heun's method without **iteration**.