## List of Corrections in the 1st Edition

Inside Cover, Page i, and on back cover page: Designation of Saumyen Guha should be "Professor"

Preface, Page vii, add at the end of acknowledgements: "Last but not least, thanks to our beloved student Shivam Gupta for writing and testing the programs on the CD."

**Chapter 1:**

| Location | Existing | Corrected |
|---|---|---|
| Page 1, para 2 | However rarely, one does | However, rarely does one |
| Page 2, line 1 | characteristics | variables or parameters |
| Page 2, last para | his own software | his or her own software |
| Page 3, para 2 | looking out the window | looking out of the window |
| Page 4 | since, $(x_n - \sqrt{a^2})$ | since, $(x_n - \sqrt{a})^2$ |
| Page 4 | since, $x_{n+1} \geq a$ | since, $x_{n+1} \geq \sqrt{a}$ |
| Page 5, para 2 | one scheme Eq. (1.4) | one scheme, Eq. (1.4), |
| -do- | the other one Eq. (1.3) | the other one, Eq. (1.3), |
| -do- | computational scheme Eq. (1.4) | computational scheme of Eq. (1.4) |
| Page 16, Example 1.5, end of example line | after 2nd para | after 1st para |

**Chapter 2:**

| Location | Existing | Corrected |
|---|---|---|
| Page 25, para1, line 1 and para 2, line 6 | x is not bold | x should be boldface |
| Page 26, para 2 | difference between the two | difference between two |
| Page 26, para 3 | $A^{-1}$ exist | $A^{-1}$ exists |
| Page 28, Eq. (2.18) and last para, line 4 | x is not bold | x should be boldface |
| Page 29, line 1 | any multiple | any scalar multiple |
| page 30, Fig. 2.4 | solid ellipse shown in the figure | should be circle |
| Page 32, last para, line 2 | x is not bold | x should be boldface |
| Page 34, line after (2.35) | *p* distinct eigenvalue | *p* distinct eigenvalues |
| Page 35, Direct Methods | group of methods obtain | group of methods obtains |
| Page 36, lines 1 and 2 | *diagonal matrix* elements of the solution vector $\mathbf{x}_i$'s can be obtained directly by dividing the elements of ***b*** vectors | *diagonal matrix,* the solution vector **x** can be obtained directly by dividing the elements of ***b*** vector |
| Page 36, 3rd line after (2.41) | for all *i* values | for all values of *i* |

| | | |
|---|---|---|
| Page 36, line after (2.42) | entries below the | entries above the |
| Page 37, line 2 | values to the | values in the |
| Page 37, section 2.2.1.1, 1st para | shown in Eq. (2.6). | shown in Eq. (2.6) with $m = n$. |
| Page 41, last para | the above diagonal elements are | the elements above the diagonal are |
| Page 42, (2.55) | "…" in the 6th column | Delete the "…" but insert three spaces so that the spacing between 5th and 7th column remain same. |
| Page 42, line after (2.56) | We leave it up to the | We leave it to the |
| Page 44, para before the end of example line | | Add at the end of the para: So, now we introduce *LU* decomposition. |
| Page 46, Theorem 2.3, line 1 | sequence of matrix | sequence of matrices |
| Page 46, Theorem 2.3, last two lines | Eqs (2.60) and (2.61)…, by Eq. (2.62) | Eqs (2.61) and (2.62)…, by Eq. (2.63) |
| Page 49, Eq. (2.72), line 3, lhs of the eq. | Subscript of *u* is *ij* | Subscript of *u* should be *kj* |
| Page 49, Eq. (2.72), line 4 | Subscript of *a* is *ij* | Subscript of *a* should be *ik* |
| Page 50, Eq. (2.74) | | Delete "=" sign between 2nd and 3rd matrix. |
| Page 50, 1st line in the paragraph after Theorem 2.4 | | *LU* and *LDU* should be italic |
| Page 50, Second line above Eq. (2.75) | | *LDU* should be italic |
| Page 55, Section 2.2.1.4, 1st Para, 2nd Line | ..as a result the quantum.. | ..as a result, the quantum.. |
| Page 55, last para, last line | Last line of the last para ends abruptly at the middle of the sentence but the line is not complete: "…can be solved" | Last line should be: "can be solved by vector operations. Thomas algorithm is one such procedure."<br>This text is moved from Page 56. |
| Page 56, 1st line below Fig. 2.5 | "by vector operations. Thomas algorithm is one such procedure." | Move this at the last line of Page 55. Delete here. |
| Page 57, Eq. 2.86 | $\beta_i = b_i - \left(\frac{l_i}{\alpha_{i-1}}\right)\beta_i$ | $\beta_i = b_i - \left(\frac{l_i}{\alpha_{i-1}}\right)\beta_{i-1}$ |
| Page 65, 1st Para, 2nd, 3rd and 4th lines | All *x, e* and $\varepsilon$ are italic | All $\boldsymbol{x}$, $\boldsymbol{e}$ and $\boldsymbol{\varepsilon}$ should be bold and italic |
| Page 65, 2nd Para, 2nd line | $\varepsilon$ is italic | $\boldsymbol{\varepsilon}$ should be bold and italic |

| | | |
|---|---|---|
| Page 65, equations after 2nd Para | *x* on the rhs of both the equations are italic | *x* on the rhs of both the equations should be bold and italic |
| Page 69, Eqs. (2.126) and (2.127) | *S* on the rhs of both the equation is italic | *S* on the rhs of both the equation should be italic and bold |
| Page 70, 2nd line | ***R***is bold and italic | *R* should be italic but not bold |
| Page 74, line before the last line | measurements with parameters | measurements for parameters |
| Page 75, 2nd Para, 1st line | coefficient matrix that the first column elements are about 3 orders | coefficient matrix that the elements in the first column are about 3 orders |
| Page 75, 3rd Para, 4th line | replace $x_1$ by $x_1'$ 10th set of equation becomes | replace $x_1$ by $x_1'$, the set of equation becomes |
| Page 80, Problem 4 | $\begin{bmatrix} 10^{-5} & 10^{-5} & 1 \\ 10^{-5} & 10^{-5} & 1 \\ 1 & 1 & 2 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 2\times10^{-5} \\ -2\times10^{-5} \\ 1 \end{bmatrix}$ | $\begin{bmatrix} 10^{-5} & 10^{-5} & 1 \\ 10^{-5} & -10^{-5} & 1 \\ 1 & 1 & 2 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 2\times10^{-5} \\ -2\times10^{-5} \\ 1 \end{bmatrix}$ (Notice the change of sign in the middle element on the left.) |
| Page 81, Problem 13, below the large matrix equation | $c^T$ | $\boldsymbol{c}^T$(Notice, *c* is bold and italic) |
| Page 81, Problem 13, matrix equation before "Answer the following:" | *A, b, x, d* in the first row and *c* of$c^T$in the 2nd row are all italic. | ***A, b, x, d***in the first row and***c***of$\boldsymbol{c}^T$in the 2nd row: all of them should be bold and italic |
| Page 81, last line | system of equation and ***Ay*** = ***b*** | system of equation ***Ay*** = ***b*** |
| Page 82, Section 2.3.1, 1st Para, 3rd line | $\{x_1, x_2, \ldots, x_n\}$ | $\{\boldsymbol{x}_1, \boldsymbol{x}_2, \ldots, \boldsymbol{x}_n\}$ (Notice, ***x*** is italic and bold.) |
| Page 92, Para after Theorem 2.8, lines 5-6 | We will demonstrate the procedure for orthogonalization stated in Theorem 2.9 by construction, | We will demonstrate the procedure for orthogonalization by construction, |
| Page 92, Para before section 2.3.5.1, line 3 | We will now show that | We will show that |
| Page 92, Para before section 2.3.5.1, line 4 | multiplication of a orthogonal matrix | multiplication of an orthogonal matrix |
| Page 98, 2nd line below Eq. (2.165) | The change can be measure in absolute | The change can be measured in absolute |

**Chapter 3:**

| **Location** | **Existing** | **Corrected** |
|---|---|---|
| Page 132, second last line | $k^{(i-1)}$-$x^{(i-2)}$ | $k(x^{(i-1)}-x^{(i-2)})$ |

| | | |
|---|---|---|
| Page 133, line before Eq. (3.27) | $x^{(i)}$ | $x_*^{(i)}$ |
| Page 134, Exercise 3.3, Problem 1, line 2 | x =cos(x/2)=0 | x =cos(x/2) |
| Page 136, Exercise 3.3, Problem 13, line 2 | method using | method |
| Page 138, third last line | One *way* | *One way* |
| Page 148, equation after Eq. (3.43) | $x_{i+1}=x_i$ - | $x^{(i+1)}=x^{(i)}$ - |
| Page 152, third line after Eq. (3.48) | $x^{(i+1)}=\phi x^{(i)}$ | $x^{(i+1)}=\phi(x^{(i)})$ |
| Page 157 | All B and J | Should be bold and italic (***B*** and ***J***) |
| Page 157, point 2 above Eq. (3.56) | $[B^{(0)}J(x^{(0)})]$ | $[\boldsymbol{B}^{(0)}=\boldsymbol{J}(\boldsymbol{x}^{(0)})]$ |

**Chapter 4:**

| **Location** | **Existing** | **Corrected** |
|---|---|---|
| Page 165 and 166 | $f(x)-B_{n(x)}$ | $f(x)-B_n(x)$ |
| Page 173, Exercise 4.2, Problem 1, last line | comments | comment |
| Page 173, fourth last line | probably, do | probably do, |
| Page 179, Box 4.2, denominator of the last term in the last equation | $<O_1, O_{m-1}>$ | $<O_{m-1}, O_{m-1}>$ |
| Page 187, Fig 4.4, axis label | *X* | *x* |
| Page 189, second line after Eq. (4.18) | *[-1,1]* | *(-1,1)* |
| Page 189, third line after Eq. (4.18) | *[a,b]* | *(a,b)* |
| Page 201, fourth last line | $c_2x^2\ c_3x^3$ | $c_2x^2+ c_3x^3$ |
| Page 208, last line | *0.60395* | *0.60395=5.49772* |
| Page 209, Exercise 4.4, Problem 2, first line | function is…to be | function…is to be |
| Page 210, first line | polynomials and | polynomials and |
| Page 210, Problem 5, third line from the end | (i.e., the points at which.. | (i.e., the point at which.. |
| Page 210, Exercise 4.4, Problem 7, first line | function x=4 | function at x=4 |
| Page 213, Last Para | Indent is less than the bulleted list | should be equal to the bulleted list |

| | | |
|---|---|---|
| Page 230, Example 4.12, 6th line of the solution | (see Exercise 4.6.3). | (see Exercise 4.6, Problem 3). |
| Page 231, Eq. (4.63) | $x^l$ at lhs and rhs | should be $x^l$ (Notice italics $l$) |
| Page 238, Problem 12, 2nd line | Lagendre | Legendre |
| Page 239, first equation | upper limit of integral missing | should be 1 |
| Page 239, first equation | $P_1$ | $P_i$ |
| Page 239, third last line | $\omega(-2\pi/T)$ | $\omega(=2\pi/T)$ |
| Page 240, last equation | Wrongly positioned | Move after the first line of preceding paragraph |
| Page 246, lines 2 and 3 below Fig. 4.13(b) | $\pi$, for $j=0$<br>$= \frac{2}{\pi}\frac{1-(-1)^j}{j^2}$, otherwise | $= \begin{cases} \pi & \text{for } j=0 \\ \frac{2}{\pi}\frac{1-(-1)^j}{j^2} & \text{otherwise} \end{cases}$ |
| Page 246 | End of example line is wrongly positioned | Move the line just above the last para |
| Page 250, Exercise 4.7, problem 2, last line | $\pi/8$ | $\pi/4$ |

**Chapter 5:**

| **Location** | **Existing** | **Corrected** |
|---|---|---|
| Page 266, sixth last line | we do…get the | we do get the |
| Page 274, Exercise 5.2, Problem 10, below the table | at the end, problem statement is missing | Estimate the acceleration at 20 s using numerical differentiation of the highest possible order. Also estimate the distance travelled in 40 s to an accuracy $O(h^6)$ applying the Romberg integration algorithm to three estimates obtained by the trapezoidal rule. |
| Page 274, Exercise 5.2, problem 11, first line | Lagrance | Lagrange |
| Page 278, first line of Eq. (5.28), lower limit of the integral | $h_{i-1}$ | $-h_{i-1}$ |
| Page 280, last para, first line | Combining the trapezoidal rule, estimate over | Combining the trapezoidal rule estimates over |
| Page 280, last para, last line above Eq. (5.34) | (…. somewhat complicated). | (…. somewhat complicated) |
| Page 304, line below Eq. (5.71) | quadrature, we get, using the fact | quadrature, and using the fact |
| Page 304, between equation (5.72) and the equation on the line before | | Insert: We get |

| | | |
|---|---|---|
| Page 307, Box 5.3, at two places | [(a,b) or (a,b)] | [a,b) or (a,b] |
| Page 312, Problem 11, Fig. 5.7 | $z = z_0$ | $z = 0$ |
| Page 313, Problem 16, third line | If *v* velocity is | If the velocity is |
| Page 313, Problem 18 | (a) single application of Simpson's rule could be applied and then evaluate the integral using (a) single application of Simpson's rule and (b) | (a) single application of Simpson's rule and (b) |

**Chapter 6:**

| **Location** | **Existing** | **Corrected** |
|---|---|---|
| Page 319, 2nd line below Eq. (6.9) | not very easy to apply. | not easy to apply. |
| Page 323, two lines above Eq. (6.21) | on the left hand side. | on the left. |
| Page 327, fourth para, first line | time stepping formulae for | time stepping schemes for |
| Page 327, fourth para, second line | methods listed | formulae listed |
| Page 331, line below Eq. (6.29) | $\gamma_0$=2/3 | $\gamma_0$=3/2 |
| Page 341, first line | $t > 0$ | $t < 0$ |
| Page 342, Problem 11, first line | Table 6.6 | Table 6.9 |
| Page 359, Fig. 6.10 | y-axis label is on the left. | Move the y-axis label to the right, next to the axis |
| Page 361, Fig. 6.11 | y-axis label is horizontal and next to the x-axis | Move it next to the y-axis above and align vertically. |
| Page 362, first line | Following in a | Following on a |
| Page 364, first bullet, 2nd line | therefore these are stable for | therefore, it is stable for |
| Page 365, 2nd line from last | $\lambda r > 0$ | $\lambda_r > 0$ |
| Page 366, Definition 6.4, first line | Eq. (6.26) | Eq. (6.83) |
| Page 372, lines 3-4 | at different locations and the starting points of the waves for imaginary part at zero time are also different. | at different locations. |
| Page 372, 2nd Para, line 4 | becomes spiral | becomes a spiral |
| Page 373, last line | the true solution. | the true solution (Fig. 6.15). |
| Page 375, Exercise 6.3, Problem 1, line 3 | $h_{n+1} = h_{n-1} + 2hf_n$ | $y_{n+1} = y_{n-1} + 2hf_n$ |

| | | |
|---|---|---|
| Page 375, Exercise 6.3, Problem 3, line 2 | in Table 6.6. …boudary…. | in Table 6.9. …boundary…. |
| Page 377, Last Para, first line | ...=1 but the values at negative… | ..=1 is known, but the values at the negative… |
| Page 383, Para below Table 6.15, 3rd line | $t$ = 0.5 | $t$ = 1.0 |
| Page 386, 2nd line | …corrector method is same… | …corrector method with repeated application of the corrector is same… |
| Page 386, Table 6.20, heading of the 6th column | $y_{n+1}^{c,i}$ | $f_{n+1}^{c,i}$ |
| Page 387, Para before Exercise 6.4, 2nd line | a system of IVPs | a system of coupled IVPs |
| Page 391, Eq. (6.112) | $u_1 = y,\ u_2 = y', u_3 = y'', \cdots u_m = y^{[m-1]}$ | $y^{[m]} = f\left(y^{[m-1]}, y^{[m-2]}, \cdots y', y; t\right)$ |
| Page 391, 3rd line above Eq. (6.115) | …the scalar arithmetic operations… | …the scalar operations… |
| Page 392, equations on the last line | ..and $\boldsymbol{f}(\boldsymbol{y},\boldsymbol{x})$=.. | ..and $\boldsymbol{f}(\boldsymbol{y},x)$=..<br>(notice $x$ is not bold) |
| Page 398, Example 6.11, first line | ..Example 6.10 using.. | ..Example 6.10 with $f''(0) = 5.0$ using.. |
| Page 404, Fig. 6.12 | Missing axes labels, dashed line is wrongly visible below horizontal axis. | Label for the horizontal axis is '$t$',<br>Label for the vertical axis is '$u$, $v$'<br>Dashed line should asymptotically disappear into horizontal axis from above and should not be visible below it. |
| Page 414, Problem 7, 2nd from last line | Can you recognize the *catenary*. | Can you recognize the *catenary*? |
| Page 420, 2nd line from last | …derivatives and a grid size… | …derivatives in (6.132) and a grid size… |

**Chapter 7:**

| **Location** | **Existing** | **Corrected** |
|---|---|---|
| Page 430, line above Eq. (7.5) | dimensional for such cases | dimensions for such cases |
| Page 432, Section 7.2, 1st Para, last line | ….helps us understand… | ….helps us to understand… |
| Page 441, Eq. (7.44) and (7.45) | numerator in the derivative term is $\varphi$ | numerator in the derivative term should be $\phi$ like every other term |
| Page 442, 1st Para, last line | …this in Example 7.1. | …this in Example 7.2. |
| Page 456, 4th Para, 1st line | Let us choose central difference for.. | Let us choose 2nd order central difference scheme for… |
| Page 456, 5th Para, 1st line | ….for the central… | ….for the 2nd order central… |

| | | |
|---|---|---|
| Page 457, 3rd line below Eq. (7.71) | …using central difference scheme. | …using 2nd order central difference scheme. |
| Page 460, Para 3, line 2 | difference approximation of … | difference or ghost node approximation of … |
| Page 460, Para 3, line 3 | For example, equations for…. | For example, 2nd order backward difference equations for…. |
| Page 463, 1st line | Node 16”: | Node 16’: |
| Page 463, Para below Eq. 7.86, line 3 | …condition has (have) changed…. | …condition(s) has (have) changed…. |
| Page 463, Para below Eq. 7.86, line 4 | …to all other entries will remain… | …to all other nodes will remain… |
| Page 464, Example 7.3, Line 3 | T(8,y) | T(2,y) |
| Page 470, 1st and 2nd Para | Last two sentences in the first para: “The line at $t$=0….the plotted result.” | Move these two sentences from the present location to the end of second para, after “…progresses with time.” |
| Page 472, Para after Eq. (7.106), last but one line | ….methods descriped in Eqs. (7.105)… | ….methods described in Eq. (7.105)… |
| Page 476, line 8 | …secondorder accuracy in time,… | …second order accuracy in time,… |
| Page 478, Eq. (7.114), Line 1 | A ‘+’ sign is missing just before the square bracket containing [1+2(….)] | Insert the ‘+’ sign before the square bracket containing [1+2(….)] |
| Page 480, 2ndpara, line 7 | Problem 3 of Exercise 7.3 a method.. | Problem 3 of Exercise 7.4 a method.. |
| Page 481, last line of Problem 2 | approximation in space…. | approximation in space with…. |
| Page 482, para below Fig 7.13, line 4 | steady temperature ($T$)….. | steady state temperature ($T$)….. |
| Page 483, Prob 7, line 1 | …circular disc shown…. | …circular disc of unit radius shown…. |
| Page 483, Prob 9, line 1 | …following hyperbolic dimensions wave equations: | …following wave equation: |
| Page 487, Eq. (7.139) | Subscript of $\lambda$ is $n$-1 | Subscript of $\lambda$ should be $m$-1 |

**Chapter 8:**

| **Location** | **Existing** | **Corrected** |
|---|---|---|
| Page 515, Line 1 | ...=$c_3$-1/35,… | ...=$c_3$=1/35,… |
| Page 529, sixth line | $x_1\Delta x_2 I=\Delta$ | $I=\Delta x_1\Delta x_2$ |
| Page 534, 1st line below Fig. 8.8 | thin holds for the… | thing holds for the… |
| Page 537, line 4 | $f(t_1)$ | $f(t_l)$ |
| Page 539, 3rd Para, line 4 | used to March forward… | used to march forward… |
| Page 546, 6th line of the section “Confidence Interval” | m and s are not correct | replace by $\mu$ and $\sigma$, respectively |
| Page 556, first equation in Section 8.7.1 | $\delta(x_i)$ | $\delta(x-x_i)$ |

| | | |
|---|---|---|
| Page 567, expression for $b_0$, second line | $b_0$=….<br>=0 ……<br>(a '-' sign is missing after zero) | $b_0$=….<br>=0 - ……<br>(put the '-' sign between zero and the next term on the same line) |
| Page 569, equation below the first para | $\ldots + 4\tilde{y} = 4$ | $\ldots + 4\widetilde{y_1} = 4$ |
| Page 573, Para below Fig. 8.20, line 4 | temperature stress has to be… | temperature distribution has to be… |
| Page 576, 2nd line above Eq. (8.91) | …which will be required… | …which may be required… |
| Page 577, 2nd line above section 8.8.3 | …i.e., is implementation…. | …*i.e.*, implementation…. |