ERRATA
Numerical Linear Algebra with Applications

William Ford

Chapter 11

Page 230

Example 11.18.

The unknowns in the pentadiagonal system should range from x_1 through x_{15}.

$$\begin{bmatrix} 6 & -4 & 1 & & \\ -4 & 6 & -4 & \ddots & \\ 1 & -4 & \ddots & \ddots & 1 \\ & \ddots & \ddots & 6 & -4 \\ & & 1 & -4 & 6 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_{14} \\ x_{15} \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ \vdots \\ 1 \\ 1 \end{bmatrix}$$

The call to `iterimp` should be

```
[xnew, iter] = iterimp(A,L,U,P,b,x1,1.0e-5,2);
```

Chapter 12

Page 247

Line after Equation 12.9.

We present a graph of the approximate solution obtained for problem 12.9 in Figure 12.7.

should read

We present a graph of the approximate solution obtained in Figure 12.7.

Page 256

Example 12.4

```
S = cubsplineb(t,y);
```

should be

```
S = cubicsplineb(t,y);
```

Chapter 13

Page 268

The first sentence in the proof of Theorem 13.1 should read

In Chapter 19 we will prove that any $n \times n$ real symmetric matrix has orthonormal eigenvectors that form a basis for $\mathbb{R}^n$.

Page 270

The first sentence of Theorem 13.3 should be

Let A be a real positive definite $n \times n$ matrix.

Chapter 14

Page 289

Example 14.4

A should be the 5×3 matrix

$$A = \begin{bmatrix} 1 & -7 & 14 \\ 6 & 0 & 4 \\ -1 & 12 & 5 \\ 4 & -8 & 3 \\ 7 & 2 & 35 \end{bmatrix}.$$

Following the sentence "Check the results by computing $\|A - QR\|_2$.", the output should be

```
Q =
    0.0985   -0.4219    0.5776
    0.5912    0.1369   -0.5645
   -0.0985    0.7396    0.1035
    0.3941   -0.4170   -0.2153
    0.6897    0.2868    0.5391

R =
   10.1489   -3.6457   28.5745
         0   15.7388    7.1273
         0         0   24.5702

norm(A-Q*R) = 2.66454e-15
```

Chapter 15

Page 309

Example 15.8

The element in row 3, column 2 should be 8:

$$A = \begin{bmatrix} 7 & 9 & -5 & 10 & 10 & -8 \\ 9 & 3 & 1 & -7 & 0 & -2 \\ -8 & 8 & 10 & 10 & 6 & 9 \end{bmatrix}.$$

The value of V is

```
V =

    0.2793   -0.5738    0.4704    0.5042   -0.1270    0.3180
   -0.4418   -0.2983    0.4480   -0.5949   -0.4005   -0.0296
   -0.2776    0.3840    0.5410    0.4336    0.0214   -0.5425
   -0.6535   -0.1707   -0.4619    0.4498   -0.3441    0.0989
   -0.4188   -0.3368    0.0686   -0.0353    0.8383    0.0492
   -0.2175    0.5401    0.2594    0.0190    0.0428    0.7691
```

Chapter 16

Page 325

Definition 16.5

Replace

$$A^\dagger = \left(A^T A\right)^{-1} A^T$$

by

$$A^\dagger = A^T \left(AA^T\right)^{-1}$$

Chapter 17

Page 362

The equation immediately above the sentence "$H_u(w)$ is a reflection of w in the plane through 0 perpendicular to u." should be

$$c_2 = \langle w, v \rangle / \|v\|_2^2.$$

In other words, in the equation for c_1 replace u by v.

Page 364

Example 17.10

In the middle of the page, replace the two statements

```
>> c2 = (w'*u)/(v'*v);
>> norm((c1*u + c2*v)-w) % w = c1*u + c2*w
```

by

```
>> c2 = (w'*v)/(v'*v);
>> norm((c1*u + c2*v)-w) % w = c1*u + c2*v
```

Page 364

Example 17.10

Seven lines before the bottom of the page. Replace

```
>> Hu^2 % Hu*Hu = Hu
```

by

```
>> Hu^2 % Hu*Hu = I
```

Chapter 18

Page 388

Example 18.3

Replace $I = 3.36 \times 10^{-4} m^4$ by $I = 3.26 \times 10^{-4} m^4$.

Page 401

In the sentence before *Theorem 18.4*, replace Theorem 18.7 by Theorem 18.4.

Page 422

In Algorithm 18.6, make these changes:

Replace $[L, U, P] = \text{luhess}(\text{A} - \sigma\text{I})$ by $[L, U, P] = \text{luhess}(\text{H} - \sigma\text{I})$.

Replace if $\|(A - \sigma I)\, x_i\|_2 < \text{tol}$ then by if $\|(H - \sigma I)\, x_i\|_2 < \text{tol}$ then.

Chapter 19

Page 440

Two sentences before Section 19.2, replace

"The sensitivity of the eigenvalues"

with

"The sensitivity of the eigenvectors"

Page 448

On the second line, delete Householder before $(n-2) \times (n-2)$.

Page 454

In Figure 19.1, the graph on the right should have the label

$f\,(\text{left})\, f\,(\text{mid}) > 0$

Chapter 21

Page 494

Example 21.2

Replace

$$\phi(x) = \frac{5}{2}x^2 + 2y^2 + xy - x - y$$

by

$$\phi(x, y) = \frac{5}{2}x^2 + 2y^2 + xy - x - y$$

Chapter 22

Page 534

Three lines from the bottom of the page, replace

and projected

by

and project

Chapter 23

Page 557

Example 23.2

The last nine lines of the example should be

```
>> S = jacobisvd(SMLSINGVAL,1.0e-15);
>> for i = 15:20
       fprintf('S(%d) = %.16f\n',i,S(i));
   end
S(15) = 1.1000000000000001
S(16) = 0.0000000000010000
S(17) = 0.0000000000001000
S(18) = 0.0000000000000100
S(19) = 0.0000000000000010
S(20) = 0.0000000000000005
```