Parallel Scientific Computing in C++ and MPI

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Corrections to First Edition, CUP

1. p. 55, top: the last entry in $\mathbf{q}_1$ should be -0.22890.

2. p. 105, bottom: change "i" to "k" in $i = 0, \ldots, N$.

3. p. 110 in the "Properties of Chebyshev Polynomials":

   a. Under "Zeroes" Bullet: "The roots of its derivative ..." should be the following: "The roots of the function $q(x) = (1 - x^2)T_n'(x)$, which are the locations of the extrema for $T_n(x)$, are the *Gauss-Lobatto points* and are given by $x_k' = \cos\frac{k\pi}{n}, k = 0, 1, \ldots, n$.

   b. Under "Orthogonality" Bullet: Last line of last equation should read i=j=0. After equation, a line should be inserted which says: "where x_k are the Chebyshev-Gauss points, and where both i and j are less than or equal to m".

4. p. 112, top: In the definition of $f(x)$ need to change the subscript of $T(x)$ to k.

5. p. 119, top: $i = 1, \ldots, n$ should read $i = 0, \ldots, n$.

6. p. 126, Table 3.1: The first four entries in the table should be modified so that: `++i` is Pre-increment, `i++` is Post-increment, `--i` is Pre-decrement, and `i--` is Post-decrement. Also note that decrement is two successive minus signs `i--`, not a single long minus sign.

7. p. 182, first line: Replace "... we will building ..." with "... we will be building...".

8. p. 183, HW 11: "Determine a spline of variable degree...", instead of "Determine a B-spline...".

9. p. 183, HW 12: Replace "... points 0,1,2,3,4." with "...points $x = 0, 1, 2, 3, 4$.

10. p. 207, top-middle: Change ϵ to e after "Let us now assume that ...".

11. p. 212, algorithm: Begin loop from $n = 0$ not 1. Also, the last statement within the loop should be: $\mathbf{f}_{n+1} = \mathbf{A}\mathbf{x}_{n+1} - \mathbf{b}$.

12. p. 216, algorithm: Begin loop from $k = 0$ not 1.

13. p. 216, bottom: Replace "...one dot product, and three daxpy ..." with "...two dot products, and three daxpy ...".

14. p. 234, middle: Sentence should read "Using the trapezoid rule with nine...".

15. p. 235, equation after "The result is" should be

$$I_G = \sum_{k=1}^{5} y_k w_k = 164.794290$$

(Note the missing "$k =$" in the sum and the change of value on the RHS).

16. p. 273 The first two lines of the comment section just above the "REMARKS" should be changed to read:

```
// At this point, process1 has in its recvbuffer the contents
// of process2's sendbuffer, process2 has in its recvbuffer
```

17. p. 322, top and bottom matrices: should have the "0" better placed.

18. p. 327: The top matrix equation should have the x-vector aligned with the rows of the matrix. Also, the zeros should be better placed. The same for the matrices just below.

19. p. 328, Thomas algorithm code: The line

```
q2[0] = -b[N-1];
```

should be

```
q2[0] = -b[0];
```

20. p. 329: Top matrices should have the zeros better placed.

21. p. 376: Final bullet before MPI_Allgather – Replace "... at least the value of ..." with "... at least the byte size of".

22. p. 377: Final bullet within the REMARKS section – Replace "... to the value of .." with "... to the byte size of ...".

23. p. 385, top: the diagram with the solid squares representing entries on the matrix needs fixing, especially the two middle blocks.

24. p. 393, middle-bottom after the paragraph starting "We can now derive the ...": In the equation $0 = -\mathbf{q}^n \ldots$ there is an extra parenthesis.

25. p. 406, first bullet in the multigrid algorithm section: Replace "... relation sweeps ..." with "... relaxation sweeps ...".

26. p. 420, equation following the statement "Specifically, we obtain for the amplitude" should have a_k^{n+1} on the LHS (as opposed to a_k^n).

27. p. 502, middle bottom: The $[\alpha \ldots 0]^T$ vector needs to have its entries aligned with the vector on the LHS.

28. p. 507, top-middle: Replace "... so they have the same eigenvalues." with "... so they have the same eigenvalues since $\mathbf{B}$ and $\mathbf{M}^{-1/2}\mathbf{B}\mathbf{M}^{1/2}$ have the same eigenvalues."

29. p. 512, Fig. 9.16 Add in parenthesis: "(The number of grid points is $n =$

30. p. 552, bottom: Better placement of "0" in the matrix.

31. p. 554, middle-bottom: Replace "... an example The initial cost ..." with "an example. The initial cost ..."

32. p. 555, middle: In the second equation from the end, the identity matrix should be bold $\mathbf{I}$.

33. p. 556, middle: Insert the word "initial" between "$\mathcal{O}(\frac{2}{3}n^3)$" and "cost".

34. p. 563, last line: In the last entry, the vector is missing: should be $\mathbf{A}^{k-1}\mathbf{v}$.

35. p. 564: The diagonals in the matrix T_k should be properly aligned.

36. p. 565, bottom: Replace "... corresponding eigenvector and orthogonality is lost." with "corresponding eigenvector, and orthogonality is lost."

37. p. 566: Remark 4: Use semi-colon just before "see".

38. p. 568, top, second equation: The sigma on the RHS be σ^*, also add at the end, "where $*$ denotes complex conjugate".