Parallel Scientific Computing in C++ and MPI

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Corrections to First Edition, CUP

1. p. 55, top: the last entry in $q_i$ should be -0.22890.

2. p. 79, bottom: The MPI_Init in the code example should be:

   MPI_Init(&argc,&argv).

3. p. 105, bottom: change “i” to “k” in $i = 0, \ldots, N$.

4. 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 $x'_k = \cos \frac{kr}{n}, k = 0, 1, \ldots, n$.
   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 $m$”.

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

6. p. 119, top: The expression

   \[ \frac{\partial R}{\partial a_i} = 0 \text{ for } i = 1, \ldots, n. \]

   should read

   \[ \frac{\partial R}{\partial a_i} = 0 \text{ for } i = 0, \ldots, n. \]

7. 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.
8. p. 182, first line: Replace “... we will building ...” with “... we will be building...”.


10. p. 183, HW 12: Replace “… points 0,1,2,3,4.” with “…points \(x = 0, 1, 2, 3, 4\).

11. p. 207, top-middle: Change \(\epsilon\) to \(e\) after “Let us now assume that ...”.

12. p. 212, algorithm: Begin loop from \(n = 0\) not 1. Also, the last statement within the loop should be: \(f_{n+1} = Ax_{n+1} - b\).

13. p. 216, algorithm: Begin loop from \(k = 0\) not 1.

14. p. 216, bottom: Replace “...one dot product, and three daxpy ...” with ”...two dot products, and three daxpy ...”.

15. p. 228, middle: Setting the moments to zero equates to:

\[
\int_{-1}^{1} F_n(x)x^k dx = 0, \quad k = 0, 1, \ldots, m - 1
\]

16. p. 234, middle: Sentence should read ”Using the trapezoid rule with nine...”.

17. 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).

18. 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
19. p. 322, top and bottom matrices: should have the "0" better placed.

20. 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.

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

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

should be

        q2[0] = -b[0];

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

23. p. 376: Final bullet before MPI_Allgather – Replace “... at least the value of ...” with “... at least the byte size of”.

24. p. 377: Final bullet within the REMARKS section – Replace “... to the value of ..” with “... to the byte size of ...”.

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

26. p. 388, SOR code: The lines:

        if(sqrt(dot(N,x,xold))<abstol){
            delete[] xold;
            return;
        }

should be

        sum1 = 0.0;
        for(i = 0; i<N; i++)
            sum1 += (xold[i]-x[i])*(xold[i]-x[i]);
if(sqrt(sum1)<abstol){
    delete[] xold;
    return;
}

27. p. 393, middle-bottom after the paragraph starting “We can now derive the ...”: In the equation \(0 = -q^n\ldots\) there is an extra parenthesis.

28. p. 406, first bullet in the multigrid algorithm section: Replace “... relation sweeps ...” with “... relaxation sweeps ...”.

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

30. p. 492, Figure 9.13: In the r.h.s. expression of \(LL^T\), \(L\)'s entry \(l_{12}\) should be \(l_{21}\) for indexing consistency.

31. p. 492, equation following Figure 9.13: \(a_{11}\) should not be squared.

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

33. p. 507, top-middle: Replace “... so they have the same eigenvalues.” with “... so they have the same eigenvalues since \(B\) and \(M^{-1/2}BM^{1/2}\) have the same eigenvalues.”

34. p. 512, Fig. 9.16 Add to caption the following parenthetical note: “(The number of grid points used is \(n = 80\))”

35. p. 552, bottom: Better placement of “0” in the matrix.

36. p. 554, middle-bottom: Replace “... an example The initial cost ...” with “an example. The initial cost ...”

37. p. 555, middle: In the second equation from the end, the identity matrix should be bold \(I\).

38. p. 556, middle: Insert the word “initial” between \(O(\frac{3}{n^3})\) and “cost”.

39. p. 563, last line: In the last entry, the vector is missing: should be \(A^{k-1}v\).
40. p. 564: The diagonals in the matrix $T_k$ should be properly aligned.

41. p. 565, bottom: Replace “... corresponding eigenvector and orthogonality is lost.” with “corresponding eigenvector, and orthogonality is lost.”

42. p. 566: Remark 4: Use semi-colon just before “see”.

43. p. 568, top, second equation: The sigma on the RHS be $\sigma^*$, also add at the end, “where * denotes complex conjugate”.

44. Appendix B, p. 589. In the MPI_Sendrecv command, the recvtag parameter is listed as type MPI_Datatype. Change to int.

45. Appendix B, p. 593. The MPI_Gather is missing ‘int root’; it should come between recvtype and comm.

46. Appendix B, p. 594. The MPI_Reduce is missing ‘MPI_Datatype datatype’; it should come between count and operator.