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## Numerical Methods and the C-language, 2016

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### Bibliography for NRC2016

Some familiarity with programming in general is assumed. Some basic knowledge of the C/C++ language is helpful, but you can also learn the few features needed during the course.

The basic reference is the huge (about 1000 pages) book:

[NRC] W. H. Press- S. A. Teukolsky- W. T. Vetterling - B. P. Flannery: **Numerical Recipes in C++**, 2nd ed. 2002, Cambridge Univ. Press, ISBN 0-521-75033-4

An older version in C is available for free on the www-page:

<http://www.haoli.org/nr/bookcpdf.html>.

If this does not work, googling with numerical recipes might work.

See also the supplementary example book by the same authors

**Numerical Recipes Example Book (C++)**, 2nd ed. 2002, Cambridge Univ. Press, ISBN 0-521-75034-2

and the accompanying CD-ROM with about 300 programs in the C++ language, version 2.11. The newest version 3.0 will not be used.

An alternative software package is GNU Scientific Library (GSL) which provides a collection of about 1400 numeric algorithms. The use of this software is described in

**GNU Scientific Library Reference Manual** by M. Galassi, J. Davies, J. Theiler, B. Gough, G. Jungman, P. Alken, M. Booth, F. Rossi, 2009, ISBN: 0-9546120-7-8 (ISBN-13: 978-0-9546120-7-8).

<http://www.gnu.org/software/gsl/manual/htmlnode/>

Some of the hard to find books about the mathematical features of the C/C++ languages are

[G] R. Glassey: **Numerical computation using C**, Academic Press, 1993, ISBN 0-12-286155-8.

[Y] D. Yang: **C++ and object oriented numeric computing for scientists and engineers**, Springer-Verlag, 2001, ISBN 0-387-98990-0.

Errata: <http://www.math.wayne.edu/~yang/book/errata.htm>

These books are pleasure to read and describe the aspects relevant for our purposes.

The complete description of the C/C++ languages can be found in:

**B. W. Kernighan- D. M. Ritchie: The C programming language**, Second ed. Prentice Hall 1988, ISBN 0-13-110362-8.

**B. Stroustrup: The C++ programming language, Third ed. Addison Wesley, 1997, ISBN 0-201-88954-4.**

Both books also contain many exercises for the readers. The solutions can be found, respectively, in

**C. L. Tondo- S. E. Gimpel: The C answer book, Second ed., Prentice Hall 1989, ISBN 0-13-109653-2.**

**D. Vandevoorde: C++ solutions, Addison Wesley, 1998, ISBN 0-201-30965-3.**

Stroustrup's book is written to serve as a handbook and as such it is rather difficult for a novice in the C++ language.

Some books on numerical methods should be mentioned, too. A very useful book, perhaps the one most frequently cited in all fields of mathematics, is

**[AS] M. Abramowitz- I. A. Stegun eds: Handbook of Mathematical Functions with formulas, Graphs and Mathematical Tables, Dover, 1965, ISBN 0-486-61272-4.**

A book with emphasis on computation is (this book has perhaps the best www-page support I have seen)

**[H] M. T. Heath: Scientific Computing- An introductory survey, Second ed. McGraw Hill, 2002, ISBN-0-07-239910-4.**

Some other widely used books are J. Stoer- R. Bulirsch, S. D. Conte- C. de Boor, R. Burden- J. Faires,.... Round-off errors are present in all numerical computation and where possible, measures should be taken to diminish the accumulation of errors. These topics are discussed in

**N. J. Higham: Accuracy and Stability of Numerical Algorithms, SIAM, 1996, ISBN 0-89871-355-2.**

Many of the applications of mathematical modeling include solution of linear systems of equations. A comprehensive monograph on this topic is

**G.H. Golub- C. F. van Loan: Matrix Computations, Fourth ed., John Hopkins Univ. Press, 2013, ISBN 978-1421407944**