A Numerical Analyst's Fifteen-Foot Shelf

Imagine a laboratory of numerical analysis, with computers, coders, problem analysts, and research mathematicians. The group varies in mathematical experience from new college graduates to professionals with long research records. Disappointingly few can profitably consult a book not in English but, pooling talents, the group can read English, French, German, Italian, Russian, and Hebrew quite well. Quite as important as a comprehensive library (assumed to lie within a few miles) is a small library in the laboratory building. What should such a working library contain?

Clearly the library needs a diversity of material, of which at least five classes can be distinguished:

A. Mathematics books.
B. Books on computing machines.
C. Tables of functions.
D. Periodicals.
E. General references (e.g., language dictionaries).

This article is a proposed list of about 150 essential titles in class A. The reader is warned that the list has been hastily prepared and is very tentative; its inclusions and omissions should not be taken too seriously.

Class A was divided into the following five categories, of which four have been split into subcategories:

1. Bibliographies on mathematics.
2. Collections of formulas.
3. Books on numerical analysis.
4. Other books on applied mathematics.
5. Books on pure mathematics.

In selecting the titles five qualities were explicitly considered: (a) adequacy of material in topics likely to be needed; (b) use of English language; (c) completeness of bibliography; (d) readability; (e) recency. The order of precedence given to these qualities depended on the book user; for mature research men it was perhaps a, c, e, b, d, (most important first), while for junior computers, perhaps b, d, a, e, c. In categories 1, 2, and 3 a considerable proportion of the available books has been listed, so that any enlargement of the library would occur mainly in categories 4 and 5.

The bibliographical citations came from the books themselves, from the Library of Congress cards, or from Parke's very helpful *Guide* (see just below). Mrs. MILDRED MARTINOLICH helped prepare the citations.

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On Finding the Characteristic Equation of a Square Matrix

Various methods are known for finding explicitly the characteristic equation of a square matrix.[1,2,3,4,5,6] Some of these make use of the Cayley-Hamilton theorem which states that every square matrix satisfies its own characteristic equation.[3,4,5] In the present paper we describe among others,