This book is useful as a reference for experts, but because of the weaknesses noted above it is not suitable as an introductory textbook.

References

1. S. Lang, *Algebra*, Addison-Wesley, Reading, MA, 1965. MR **33**:5416
2. J. H. McClellan and C. M. Rader, *Number theory in digital signal processing*, Prentice-Hall, Englewood Cliffs, NJ, 1979.

H. N.

28[11-00, 11B83]—*The encyclopedia of integer sequences*, by N. J. A. Sloane and Simon Plouffee, Academic Press, San Diego, CA, 1995, xiv+587 pp., $23\frac{1}{2}$ cm, $44.95

The title of this book is an accurate description, although some might argue that "A Dictionary of Integer Sequences" is a better title: it is literally a listing of some 5488 integer sequences, together with a brief description for each. The book is an updated printing, with more than twice as many entries, of an earlier book by Sloane [1].

The entries are listed in lexicographic order, except that for some reason the authors chose not to use zeros and ones in this ordering. The listing for an individual entry typically includes a sequence identification number for cross references, such as "M1234"; the leading elements of the sequence itself (typically two lines or so); a brief description, such as "orders of simple groups"; and, in many cases, an abbreviated reference, such as "MOC 21 246 67" (*Mathematics of Computation*, vol. 21, pg. 246, 1967).

For a few of the particularly interesting entries, the authors include a part- or full-page figure explaining the origin and significance of the sequence. Accompanying the entry M0692, which is a Fibonacci sequence $(1, 1, 2, 3, 5, 8, 13, 21, \ldots)$, the authors define the Fibonacci and Lucas numbers with the help of tree diagrams. Accompanying entry M1141, which is the sequence of generalized Catalan numbers $(1, 1, 1, 2, 4, 8, 17, 37, \ldots)$, is an inset explaining that these numbers arise in the enumeration of structures of RNA molecules. Accompanying entry M3987, the authors graphically list different ways in which an $n \times n$ chess board may be dissected into four congruent pieces. Accompanying entry M3218, the theta series of a lattice is defined and described in some detail.

In addition to the entries listed above, the book includes entries as diverse as the digits of π, the Euler numbers, the denominators of the Bernoulli numbers, successive values of the Euler totient function, the continued fraction elements of e, the elements of the recursion $a_n = a_{n-1} + a_{n-3}$, the numbers of planar maps with n edges, the numbers of irreducible positions of size n in Montreal solitaire and the Euler-Jacobi pseudoprimes.

In order to ascertain the completeness of the reference, this reviewer attempted to find a number of sequences that he has encountered in various research activities. In the majority of cases, the sequence was found. Here are some that were not: the continued fraction expansions for $\log 2$ and $\sqrt[3]{2}$, the denominators in the Taylor expansions of $\tan x$ and $e^x \cos x$, and the known Wieferich primes.

Such an exercise highlights both the value and the limitations of this type of reference. On one hand, it is very useful to be able to quickly identify an integer sequence that one encounters in research work. On the other hand, any reference book of this sort will be necessary incomplete. What is really needed are some effective algorithms and robust computational tools. The authors, in an introductory section, give an overview of known techniques of this sort, plus some tools that are available. For some readers, this will be the most valuable section of the book.

References

1. N. J. A. Sloane, *A handbook of integer sequences*, Academic Press, New York, 1973. MR **50**:9760

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