Bridger, Mark
Real analysis. A constructive approach. (English) Zbl 1113.26001

This is not just another book on calculus, not even on analysis. It is based on an idea of Stolzenberg to introduce real numbers via rational interval arithmetic. Let us quote the author:

“In summary, this is neither a text in numerical analysis nor intended to prepare students to be professional mathematicians. It is a thoroughly rigorous modern account of the theoretical underpinning of calculus; and, being of constructive nature, every proof of every result is direct and ultimately computationally verifiable (at least in principle). In particular, existence is never established by showing that the assumption of non-existence leads to a contradiction. By looking through the index or table of contents, you’ll see that nothing of importance for undergraduates has been left off or compromised by our approach. The payoff of the constructive approach, however, is that it makes sense – not just to math majors, but to students from all branches of sciences.”

It may be added that it is highly advisable that these students have a wide and workable knowledge of calculus before they start to work on this book. The first chapters are presented at a very nice leisurely pace, which makes reading and learning enjoyable. Many interesting exercises (unfortunately, solutions are not presented) help the reader to test what has been learned, just as the occasional invitation to complete a proof. However, being a book about what analysis is really supposed to be, this pace will speed up considerably in the remaining chapters and, in spite of the constructive approach, it may not be entirely excluded that at least a non-pro-mathematician may occasionally risk to get slightly lost within the extreme purity of the presented mathematical language.

Reviewer: Hansueli Hösli (Ittigen)

MSC:

- 26-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to real functions
- 03F60 Constructive and recursive analysis
- 26E40 Constructive real analysis

Keywords:
real numbers; uniform continuity