About this Textbook

The typical introductory real analysis text starts with an analysis of the real number system and uses this to develop the definition of a limit, which is then used as a foundation for the definitions encountered thereafter. While this is certainly a reasonable approach from a logical point of view, it is not how the subject evolved, nor is it necessarily the best way to introduce students to the rigorous but highly non-intuitive definitions and proofs found in analysis.

This book proposes that an effective way to motivate these definitions is to tell one of the stories (there are many) of the historical development of the subject, from its intuitive beginnings to modern rigor. The definitions and techniques are motivated by the actual difficulties encountered by the intuitive approach and are presented in their historical context. However, this is not a history of analysis book. It is an introductory analysis textbook, presented through the lens of history. As such, it does not simply insert historical snippets to supplement the material. The history is an integral part of the topic, and students are asked to solve problems that occur as they arise in their historical context.

This book covers the major topics typically addressed in an introductory undergraduate course in real analysis in their historical order. Written with the student in mind, the book provides guidance for transforming an intuitive understanding into rigorous mathematical arguments. For example, in addition to more traditional problems, major theorems are often stated and a proof is outlined. The student is then asked to fill in the missing details as a homework problem.

About the Authors

Robert Rogers

Robert Rogers received his BS in Mathematics with Certification in Secondary Education from Buffalo State College in 1979. He earned his MS in Mathematics from Syracuse University in 1980 and his Ph.D. in Mathematics from the University of Buffalo in 1987, specializing in Functional Analysis/Operator Theory. He has been on the faculty of the State University of New York at Fredonia since 1987 where he is currently Professor of Mathematics. He is a recipient of the SUNY Fredonia President's Award for Excellence in Teaching and the MAA Seaway Section's Clarence F. Stephens' Award for Distinguished Teaching. He is also a recipient of the MAA Seaway Section's Distinguished Service Award. He is currently the editor of the *New York State Mathematics Teachers' Journal*.

Eugene Boman

Eugene Boman received his BA from Reed College in 1984, his MA in 1986 and his Ph.D. in 1993, both of the latter were from the University of Connecticut. He has been teaching math at The Pennsylvania State University since 1996, first at the DuBois campus (1996-2006) and then at the Harrisburg campus. In 2008 he won the Carl B. Allendorfer Award for excellence in expository mathematical writing from the editors of *Mathematics Magazine*, for the article "Mom! There's an Astroid in My Closet" (*Mathematics Magazine*, Vol. 80 (2007), pp. 247-273).

Reviewer's Notes

Many undergraduate mathematics programs require at least one semester of real analysis. Topics in real analysis are dry subjects for many students and they consider the course to be the most challenging or intimidating of all their mathematics courses. However, these topics are very important for many branches of mathematics. This book looks at the topics from a historical perspective and explains mathematics by engaging students into a conversation. Topics become interesting and meaningful to students. If the instructor employs this historical development of mathematics rather than a strictly logical ordering of materials traditionally followed in many standard textbooks, the course becomes an enjoyable experience for all students including the instructor. The book alleviates those concerns by systematically including historical perspectives and solving the problems in a conversational manner. The wide variety of interesting exercises in the book ranges from the computational to the more conceptual and the difficulty varies. Many interesting applied exercises are included. Problems stimulate students to independent thinking in discovering analysis. The presentation is engaging and motivates the student with numerous examples, remarks, illustrations, and exercises. Clearly, it is a carefully written book with a thoughtful perspective for students.

Osman Yurekli, Ph.D.

Osman Yurekli received his B.A. from University of Istanbul in 1979 and his Ph.D. from University of California at Santa Barbara in 1988. He has spent his mathematical career at Ithaca College. He conducts research in classical analysis and enjoys doing research with undergraduates. Beyond mathematics, he also has interests in traveling, bicycling and kayaking.

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The pilot launched in 2012, providing an editorial framework and service to authors, students and faculty, and establishing a community of practice among libraries. The first pilot is publishing 15 titles in 2013, with a second pilot to follow that will add more textbooks and participating libraries.

Participating libraries in the 2012-2013 pilot include SUNY Geneseo, College at Brockport, College of Environmental Science and Forestry, SUNY Fredonia, Upstate Medical University, and University at Buffalo, with support from other SUNY libraries and SUNY Press.

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