

Preface to the Third Edition

In contemplating the third edition, I have had multiple objectives to achieve. The first and foremost important objective is to maintain the accessibility and readability of the book to a broad readership with varying mathematical backgrounds and sophistication. More proofs, more graphs, more explanations, and more applications are provided in this edition.

The second objective is to update the contents of the book so that the reader stays abreast of new developments in this vital area of mathematics. Recent results on local and global stability of one-dimensional maps are included in Chapters 1, 4, and Appendices A and C. An extension of the Hartman–Grobman Theorem to noninvertible maps is stated in Appendix D. A whole new section on various notions of the asymptoticity of solutions and a recent extension of Perron’s Second Theorem are added to Chapter 8. In Appendix E a detailed proof of the Levin–May Theorem is presented. In Chapters 4 and 5, the reader will find the latest results on the larval–pupal–adult flour beetle model.

The third and final objective is to better serve the broad readership of this book by including most, but certainly not all, of the research areas in difference equations. As more work is being published in the *Journal of Difference Equations and Applications* and elsewhere, it became apparent that a whole chapter needed to be dedicated to this enterprise. With the prodding and encouragement of Gerry Ladas, the new Chapter 5 was born. Major revisions of this chapter were made by Fozi Dannan, who diligently and painstakingly rewrote part of the material and caught several errors and typos. His impact on this edition, particularly in Chapters 1, 4, and Chapter 8 is immeasurable and I am greatly indebted to him. My thanks

go to Shandelle Henson, who wrote a thorough review of the book and suggested the inclusion of an extension of the Hartman–Groman Theorem, and to Julio Lopez and his student Alex Sepulveda for their comments and discussions about the second edition.

I am grateful to all the participants of the AbiTUMath Program and to its coordinator Andreas Ruffing for using the second edition as the main reference in their activities and for their valuable comments and discussions. Special thanks go to Sebastian Pancratz of AbiTUMath whose suggestions improved parts of Chapters 1 and 2. I benefited from comments and discussions with Raghil Abu-Saris, Bernd Aulbach, Martin Bohner, Luis Carvahlo, Jim Cushing, Malgorzata Guzowska, Sophia Jang, Klara Janglajew, Nader Kouhestani, Ulrich Krause, Ronald Mickens, Robert Sacker, Hassan Sedaghat, and Abdul-Aziz Yakubu. It is a pleasure to thank Ina Lindemann, the editor at Springer-Verlag for her advice and support during the writing of this edition. Finally, I would like to express my deep appreciation to Denise Wilson who spent many weekends typing various drafts of the manuscript. Not only did she correct many glitches, typos, and awkward sentences, but she even caught some mathematical errors.

I hope you enjoy this edition and if you have any comments or questions, please do not hesitate to contact me at selaydi@trinity.edu.

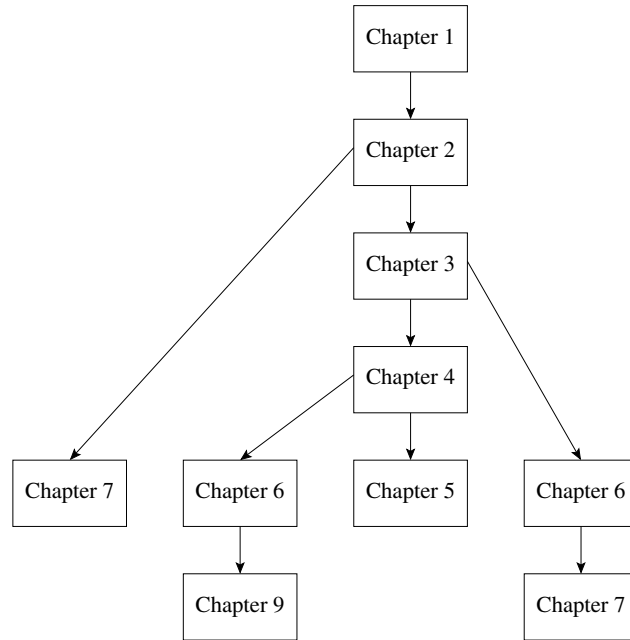
San Antonio, Texas
April 2004

Saber N. Elaydi

Suggestions for instructors using this book.

The book may be used for two one-semester courses. A first course may include one of the following options but should include the bulk of the first four chapters:

1. If one is mainly interested in stability theory, then the choice would be Chapters 1–5.
2. One may choose Chapters 1–4, and Chapter 8 if the interest is to get to asymptotic theory.
3. Those interested in oscillation theory may choose Chapters 1, 2, 3, 5, and 7.
4. A course emphasizing control theory may include Chapters 1–3, 6, and 10.



The diagram above depicts the dependency among the chapters.



<http://www.springer.com/978-0-387-23059-7>

An Introduction to Difference Equations

Elaydi, S.

2005, XXII, 540 p., Hardcover

ISBN: 978-0-387-23059-7