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Nota di contenuto	Preface; Contents; Acknowledgements; 1. Tools for the rigorous proof of chaos and bifurcations; 2. 2-D quadratic maps: The invertible case; 3. Classification of chaotic orbits of the general 2-D quadratic map; 4. Rigorous proof of chaos in the double-scroll system; 5. Rigorous analysis of bifurcation phenomena; Bibliography; Index
Sommario/riassunto	This book is based on research on the rigorous proof of chaos and bifurcations in 2-D quadratic maps, especially the invertible case such as the Hnon map, and in 3-D ODE's, especially piecewise linear systems such as the Chua's circuit. In addition, the book covers some recent works in the field of general 2-D quadratic maps, especially their classification into equivalence classes, and finding regions for chaos, hyperchaos, and non-chaos in the space of bifurcation parameters. Following the main introduction to the rigorous tools used to prove chaos and bifurcations in the two representative systems, is the study of the invertible case of the 2-D quadratic map, where previous works are oriented toward Hnon mapping. 2-D quadratic

maps are then classified into 30 maps with well-known formulas. Two proofs on the regions for chaos, hyperchaos, and non-chaos in the space of the bifurcation parameters are presented using a technique based on the second-derivative test and bounds for Lyapunov exponents. Also included is the proof of chaos in the piecewise linear Chua's system using two methods, the first of which is based on the construction of Poincare map, and the second is based on a computer-assisted proof. Finally, a rigorous analysis is provided on the bifurcational phenomena in the piecewise linear Chua's system using both an analytical 2-D mapping and a 1-D approximated Poincare mapping in addition to other analytical methods.
