## Contents

Part I	Introduction	
Introducto	ory Remarks. By G. Mayer-Kress (With 4 Figures)	2
Part II	General Theory, Mathematical Aspects of Dimensions, Basic Problems	
Singulariti	acterization of Fractal Measures as Interwoven Sets of es: Global Universality at the Transition to Chaos accia (With 10 Figures)	8
and Multi	easures (Their Infinite Moment Sequences and Dimensions) plicative Chaos: Early Works and Open Problems fandelbrot	19
	susdorff Dimension of Graphs and Random Recursive By R.D. Mauldin	28
	aos Phase Transition and Dimension Fluctuation awa (With 9 Figures)	34
	Dimensions for Sets with Broken Scaling Symmetry Imberger, G. Mayer-Kress, and E. Jen (With 5 Figures)	42
Scaling in	Fat Fractals. By J.D. Farmer	<b>5</b> 4
Part III	Numerical and Experimental Problems in the Calculati of Dimensions and Entropies	on
	oss-Sections and Dimension of the Double Rotor Attractor ostelich and J.A. Yorke (With 3 Figures)	6:
	actal Dimension of Filtered Chaotic Signals lii and A. Politi (With 5 Figures)	6'
	lgorithms for Computing Fractal Dimensions tt and F. Sullivan (With 2 Figures)	74



Using Mutual Information to Estimate Metric Entropy By A.M. Fraser (With 3 Figures)	82
Part IV Computation of Lyapunov Exponents	
Intermediate Length Scale Effects in Lyapunov Exponent Estimation By A. Wolf and J.A. Vastano (With 4 Figures)	
Comparison of Algorithms for Determining Lyapunov Exponents from Experimental Data By J.A. Vastano and E.J. Kostelich (With 5 Figures)	
A Measure of Chaos for Open Flows By R.J. Deissler and K. Kaneko (With 1 Figure)	100
Part V Reliability, Accuracy and Data Requirements of Different Algorithms	 e <b>nt</b>
An Approach to Error-Estimation in the Application of Dimension Algorithms. By J. Holzfuss and G. Mayer-Kress (With 7 Figures)	114
Invisible Errors in Dimension Calculations: Geometric and Systematic Effects  By W.E. Caswell and J.A. Yorke (With 10 Figures)	123
Methods for Estimating the Intrinsic Dimensionality of High- Dimensional Point Sets. By R.L. Somorjai	137
Part VI Analysing Spatio Temporal Chaos	
Characterizing Turbulent Channel Flow By A. Brandstater, H.L. Swinney, and G.T. Chapman	150
Characterization of Chaotic Instabilities in an Electron-Hole Plasma in Germanium  By G.A. Held and C.D. Jeffries (With 5 Figures)	158
Instabilities, Turbulence, and the Physics of Fixed Points By M. Duong-van (With 5 Figures)	171
Part VII Experimental Results and Applications	
Determination of Attractor Dimension and Entropy for Various Flows: An Experimentalist's Viewpoint By J.G. Caputo, B. Malraison, and P. Atten (With 13 Figures)	180

Transition from Quasiperiodicity into Chaos in the Periodically Driven Conductivity of BSN Crystals  By S. Martin and W. Martingson (With 5 Figures)	191
By S. Martin and W. Martienssen (With 5 Figures)	191
By H. Haucke, R.E. Ecke, and J.C. Wheatley (With 11 Figures)	198
Experimental Study of the Attractor of a Driven Rayleigh- Bénard System. By J. Stavans, S. Thomae, and A. Libchaber (With 4 Figures)	207
Dimension Measurements from Cloud Radiance By P.H. Carter, R. Cawley, A.L. Licht, J.A. Yorke, and M.S. Melnik (With 5 Figures)	215
Chaos in Open Flow Systems By K.R. Sreenivasan (With 7 Figures)	222
Lasers and Brains: Complex Systems with Low-Dimensional Attractors. By A.M. Albano, N.B. Abraham, G.C. de Guzman, M.F.H. Tarroja, D.K. Bandy, R.S. Gioggia, P.E. Rapp, I.D. Zimmerman, N.N. Greenbaun, and T.R. Bashore	
(With 6 Figures)	231
Evidence of Chaotic Dynamics of Brain Activity During the Sleep Cycle. By A. Babloyantz (With 2 Figures)	241
Problems Associated with Dimensional Analysis of Electroencephalogram Data	`
By S.P. Layne, G. Mayer-Kress, and J. Holzfuss (With 8 Figures)	246
Index of Contributors	257