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two-dimensional cascades; The cascade wind tunnel; Cascade test results; Compressor cascade performance; Turbine cascade performance; Compressor cascade correlations; Fan blade design (McKenzie); Turbine cascade correlation (Ainley and Mathieson); Comparison of the profile loss in a cascade and in a turbine stage; Optimum space-chord ratio of turbine blades (Zweifel); References; Problems; Chapter 4. Axial-flow Turbines: Two-dimensional Theory; Introduction; Velocity diagrams of the axial turbine stage Thermodynamics of the axial turbine stageStage losses and efficiency; Soderberg's correlation; Types of axial turbine design; Stage reaction; Diffusion within blade rows; Choice of reaction and effect on efficiency; Design point efficiency of a turbine stage; Maximum total-to-static efficiency of a reversible turbine stage; Stresses in turbine rotor blades; Turbine flow characteristics; Flow characteristics of a multistage turbine; The Wells turbine; Pitch-controlled blades; References; Problems; Chapter 5. Axial-flow Compressors and Fans; Introduction Two-dimensional analysis of the compressor stageVelocity diagrams of the compressor stage; Thermodynamics of the compressor stage; Stage loss relationships and efficiency; Reaction ratio; Choice of reaction; Stage loading; Simplified off-design performance; Stage pressure rise; Pressure ratio of a multistage compressor; Estimation of compressor stage efficiency; Stall and surge phenomena in compressors; Control of flow instabilities; Axial-flow ducted fans; Blade element theory; Blade element efficiency; Lift coefficient of a fan aerofoil; References; Problems
Chapter 6. Three-dimensional Flows in Axial Turbomachines

Sommario/riassunto

The new edition will continue to be of use to engineers in industry and technological establishments, especially as brief reviews are included on many important aspects of Turbomachinery, giving pointers towards more advanced sources of information. For readers looking towards the wider reaches of the subject area, very useful additional reading is referenced in the bibliography. The subject of Turbomachinery is in continual review, and while the basics do not change, research can lead to refinements in popular methods, and new data can emerge. This book has applications for professiona

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Nota di contenuto	Reviews of Nonlinear Dynamics and Complexity; Contents; Preface; List of Contributors; 1 The Chaos Computing Paradigm; 1.1 Brief History of Computers; 1.2 The Conceptualization, Foundations, Design and Implementation of Current Computer Architectures; 1.3 Limits of Binary Computers and Alternative Approaches to Computation: What Lies Beyond Moore's Law?; 1.4 Exploiting Nonlinear Dynamics for Computations; 1.5 General Concept; 1.6 Continuous-Time Nonlinear System; 1.7 Proof-of-Principle Experiments; 1.7.1 Discrete-Time Nonlinear System; 1.7.2 Continuous-Time Nonlinear System 1.8 Logic from Nonlinear Evolution: Dynamical Logic Outputs1.8.1 Implementation of Half- and Full-Adder Operations; 1.9 Exploiting Nonlinear Dynamics to Store and Process Information; 1.9.1 Encoding Information; 1.9.2 Processing Information; 1.9.3 Representative Example; 1.9.4 Implementation of the Search Method with Josephson Junctions; 1.9.5 Discussions; 1.10 VLSI Implementation of Chaotic Computing Architectures: Proof of Concept; 1.11 Conclusions; References; 2 How Does God Play Dice?; 2.1 Introduction; 2.2 Model; 2.2.1 Bounce Map with Dissipation

2.3 Phase Space Structure: Poincare Section2.4 Orientation Flip Diagrams; 2.5 Bounce Diagrams; 2.6 Summary and Conclusions; 2.7 Acknowledgments; References; 3 Phase Reduction of Stochastic Limit-Cycle Oscillators; 3.1 Introduction; 3.2 Phase Description of Oscillator; 3.3 Oscillator with White Gaussian Noise; 3.3.1 Stochastic Phase Equation; 3.3.2 Derivation; 3.3.3 Steady Phase Distribution and Frequency; 3.3.4 Numerical Examples; 3.4 Oscillator with Ornstein-Uhlenbeck Noise; 3.4.1 Generalized Stochastic Phase Equation; 3.4.2 Derivation; 3.4.3 Steady Phase Distribution and Frequency
3.4.4 Numerical Examples3.4.5 Phase Equation in Some Limits; 3.5 Noise effect on entrainment; 3.5.1 Periodically Driven Oscillator with White Gaussian Noise; 3.5.2 Periodically Driven Oscillator with Ornstein-Uhlenbeck Noise; 3.5.3 Conjecture; 3.6 Summary; References; 4 Complex Systems, numbers and Number Theory; 4.1 A Statistical Pattern in the Prime Number Sequence; 4.1.1 Benford's Law and Generalized Benford's Law; 4.1.2 Are the First-Digit Frequencies of Prime Numbers Benford Distributed?; 4.1.3 Prime Number Theorem Versus Size-Dependent Generalized Benford's Law
4.1.4 The Primes Counting Function L(N)4.1.5 Remarks; 4.2 Phase Transition in Numbers: the Stochastic Prime Number Generator; 4.2.1 Phase Transition; 4.2.1.1 Network Image and Order Parameter; 4.2.1.2 Annealed Approximation; 4.2.1.3 Data Collapse; 4.2.2 Computational Complexity; 4.2.2.1 Worst-Case Classification; 4.2.2.2 Easy-Hard-Easy Pattern; 4.2.2.3 Average-Case Classification; 4.3 Self-Organized Criticality in Number Systems: Topology Induces Criticality; 4.3.1 The Division Model; 4.3.2 Division Dynamics and SOC; 4.3.3 Analytical Developments: Statistical Physics Versus Number Theory
4.3.4 A More General Class of Models

Sommario/riassunto

Written in a style that breaks the barriers between the disciplines, this monograph enables researchers from life science, physics, engineering, or chemistry to access the most recent results in a common language. The resulting review character of this project sets it apart from specialized journals, and allows each volume to respond quickly to new developments.This third volume contains new topics ranging from chaotic computing, via random dice tossing and stochastic limit-cycle oscillators, to a number theoretic example of self-organized criticality, wave localization in complex networks