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Clustering in Chaotic Systems; 6. Chaos and Synchronization; 6.1 Chaos in Simple Systems; 6.1.1 Lyapunov exponents; 6.1.2 Phase and amplitude in chaotic systems
6.2 Synchronization of Two Coupled Maps6.2.1 Saw-tooth maps; 6.3 Synchronization of Two Coupled Oscillators; 6.3.1 Phase synchronization; 6.3.2 Lag synchronization; 6.3.3 Synchronization in the Lorenz system; 7. Synchronization in Populations of Chaotic Elements; 7.1 Ensembles of Identical Oscillators; 7.1.1 Master stability functions; 7.1.2 Synchronizability of arbitrary connection topologies; 7.2 Partial Entrainment in Rossler Oscillators; 7.2.1 Phase synchronization; 7.3 Logistic Maps; 7.3.1 Globally coupled logistic maps; 7.3.2 Heterogeneous ensembles; 7.3.3 Coupled map lattices
8. Clustering8.1 Dynamical Phases of Globally Coupled Logistic Maps; 8.1.1 Two-cluster solutions; 8.1.2 Clustering phase of globally coupled logistic maps; 8.1.3 Turbulent phase; 8.2 Universality Classes and Collective Behavior in Chaotic Maps; 8.3 Randomly Coupled Logistic Maps; 8.4 Clustering in the Rossler System; 8.5 Local Coupling; 9. Dynamical Glasses; 9.1 Introduction to Spin Glasses; 9.2 Globally Coupled Logistic Maps as Dynamical Glasses; 9.3 Replicas and Overlaps in Logistic Maps; 9.4 The Thermodynamic Limit; 9.5 Overlap Distributions and Ultrametricity
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Bibliography

Sommario/riassunto

Synchronization processes bring about dynamical order and lead tospontaneous development of structural organization in complex systemsof various origins, from chemical oscillators and biological cells tohuman societies and the brain. This book provides a review and adetailed theoretical analysis of synchronization phenomena in complexsystems with different architectures, composed of elements withperiodic or chaotic individual dynamics. Special attention is paid tostatistical concepts, such as nonequilibrium phase transitions, orderparameters and dynamical glasses.