List of references: Ergodic thory / Dynamical systems

Dynamical systems and Ergodic theory are broad subjects. It consists of various aspects of phenomena. I tried to introduce books that would be helpful for graduate students. These books contain good materials to learn what has been studied in the research area. Please let me know if you are aware of any other books not included in the list.

Suggested reading for all students

1. The Princeton Companion to Mathematics, Timothy Gowers, June Barrow-Green, Imre Leader. - This book contains a great introduction to general research topics!
2. An Epsilon of Room, I: Real Analysis An Epsilon of Room, I: Real Analysis: pages from year three of a mathematical blog, T. Tao

Basic text

1. Introduction to Dynamical Systems Book by G. Stuck and Michael Brin, 2002
2. Ergodic Theory: with a view towards Number Theory, Manfred Einsiedler and Thomas Ward.
3. Introduction to the Modern Theory of Dynamical Systems, Anatole Katok, 1995
4. Introduction to Smooth Ergodic Theory, Luís Barreira and Yakov Pesin
5. Lecture Notes on Ergodic Theory, O. Sarig [pdf]
6. Geodesic and Horocyclic Trajectories, Françoise Dal'Bo.
7. T. Tao's blog - Ergodic theory. [Link]
8. Ordinary differential equations with applications, Chicone
9. Henk Bruin's note [pdf]
10. Probability Theory and Examples, Durett

These books are only suggested for reading based on your research interest.

Interval exchange maps / Teichmüller theory

1. Introduction to Teichmüller theory and its applications to dynamics of interval exchange transformations, flows on surfaces, and billiards. Forni and Matheus [pdf]
2. Ergodic theory of interval exchange maps, Viana [pdf]
3. Translation surfaces, Arthreya and Masur
4. A Primer on Mapping Class Groups, Benson Farb and Dan Margalit

Symbolic dynamics

1. Topological and Ergodic Theory of Symbolic Dynamics, Henk Bruin [pdf]

Hyperbolic dynamics

1. Hyperbolic flows, Todd Fisher and Boris Hasselblatt
2. Introduction to Partially hyperbolic dynamics, [pdf]
3. Global Stability of Dynamical Systems, Shub

Transfer operator methods

1. Stochastic Dynamics of Deterministic Systems, Viana [pdf]
2. Introduction to the transfer operator method, O. Sarig [pdf]
3. Transfer Operators in Hyperbolic Dynamics, Nilofar, Carlangelo Liverani, Demers
4. Statistical properties of dynamics. Introduction to the functional analytic approach, S. Galatolo [pdf]
5. Perturbation Theory for Linear Operators. Kato.
6. Positive Transfer Operators and decay of correlations, V. Baladi
7. Dynamical Zeta Functions and Dynamical Determinants for Hyperbolic Maps, V. Baladi

Homogeneous dynamics

1. Ergodic Theory and Topological Dynamics of Group Actions on Homogeneous Spaces, M. Bachir Bekka and Matthias Mayer
2. Dynamical systems on homogeneous spaces, Starkov
3. Ratner's Theorems on Unipotent Flows, Dave Witte Morris
4. Homogeneous Dynamics and Applications, Manfred Einsiedler and Thomas Ward. [Link]
5. Entropy in ergodic theory and homogeneous dynamics, E. Lindenstrauss, Manfred Einsiedler and Thomas Ward. [Link]

Rigidity and cocycles in higher rank actions

1. Rigidity in Higher Rank Abelian Group Actions, Anatole Katok and Viorel Niţică
2. Combinatorial Constructions in Ergodic Theory and Dynamics. Anatole Katok.

Random dynamics

1. Random Perturbations of Dynamical Systems, Yuri Kifer
2. Local Limit Theorems for Inhomogeneous Markov Chains, Dolgopyat and Sarig.
3. An Introduction to the Theory of Point Processes vol I, II, D.J. Daley D and Vere-Jones.
4. A Course on Large Deviations with an Introduction to Gibbs Measures, Firas Rassoul-Agha Timo Seppalainen

Random walks

1. Two-Dimensional Random Walk, Serguei Popov [pdf]
2. Non-homogeneous Random Walks, Mikhail Menshikov Serguei Popov, and Andrew Wade.
3. Principles of Random Walk, F. Spitzer
4. Random walks on reductive groups, Jean-François Quint, Yves Benoist
5. Random walks on infinite graphs and groups, Woess

Circle diffeomorphisms

1. Continued Fractions, Khinchin
2. One-Dimensional Dynamics From Poincaré to renormalization, Yiheng Dong , Marco Martens, and Liviana Palmisano

Lyapunov Exponents

1. Lectures on Lyapunov Exponents, Viana
2. Lyapunov Exponents of Linear Cocycles: Continuity via Large Deviations. Pedro Duarte, Silvius Klein

Relations with Lie groups and representation

1. Unitary Representations and Unitary Duals, Manfred Einsiedler and Thomas Ward.
2. Nilpotent Structures in Ergodic Theory, Bernard Host and Bryna Kra
3. Representations of nilpotent Lie groups and their applications, Corwin and Greenleaf
4. Ergodic theory and semisimple groups, Zimmer
5. Discrete subgroups of Semisimple Lie groups, Margulis
6. Representation theory of semisimple groups, Knapp

Applications in Number Theory

1. Metric Diophantine approximation and dynamical systems, Dmitry Kleinbock [pdf]
2. Sequences, Discrepancies and Applications, Michael Drmota and Robert F. Tichy
3. Equidistribution in Number Theory, An Introduction, Andrew Granville, Zeév Rudnick

KAM methods

1. A tutorial on KAM theory, R. Llave.
2. The KAM Story: A Friendly Introduction by H. Scott Dumas

Hamiltonian systems

1. Mathematical Methods of Classical Mechanics by V.I. Arnold

Further reading: miscellaneous

1. Zeta functions and the periodic orbit structure of hyperbolic dynamics. Parry.
2. Fuchsian Groups, Svetlana Katok.
3. Ergodic Theory via Joinings, Eli Glasner
4. An Introduction to Infinite Ergodic Theory, Jon Aaronson.
5. Dynamical Systems and an example: Billiards, Carlangelo Liverani [pdf]
6. Chaotic Billiards - Nikolai Chernov, Roberto Markarian
7. Dimension theory in dynamical systems, Ya. B. Pesin
8. Dimension Theory of Hyperbolic Flows, Luis Barreira

Survey for the ICM Proceedings

Corinna Ulcigrai [pdf], Simion Filip [pdf], etc...

Collections of introductory articles

1. Collected Works of Anatole Katok, (in 2 Volumes)
2. Modern Dynamical Systems and Applications. 2004