

MATH 497 B Projects

- (1) Homeomorphisms of the circle and rotation number
KH1 Sec 4.3, **KH2** Chapter 11
- (2) Denjoy theorem and example
KH2 Sections 12.1, 12.2, and main notions and facts from Chapter 11.
- (3) Continued fractions, Diophantine approximation, and dynamics
KH1 Ch 15
- (4) Markov chains
KH2 Section 1.9, **KH1** Section 7.3.7
- (5) Coding and Markov partitions
KH2 Section 2.5
- (6) Newtonian systems of classical mechanics
KH1 Section 6.2, **KH2** Section 5.3.
- (7) Sharkovski theorem
KH2 15.3
- (8) Julia sets of polynomials (requires familiarity with complex functions)
F Chapter 14
- (9) Hausdorff dimension
F Chapter 2
- (10) Von Neumann's mean ergodic theorem
- (11) Birkhoff ergodic theorem (Requires some familiarity with measures)
P Chapter 1
- (12) Subadditive ergodic theorem (Requires some familiarity with measures)
P Chapter 2
- (13) Dynamical models in biology (Choose and study a model)
Miklós Farkas. Dynamical Models in Biology. ISBN-13: 978-0122491030

References:

- KH1** B. Hasselblatt and A. Katok. A First Course in Dynamics with Panorama of Recent Developments. ISBN: 978-0-5215-8750-1
- KH2** B. Hasselblatt and A. Katok. Introduction to the Modern Theory of Dynamical Systems. ISBN-13: 978-0521341875
- F** K. Falconer. Fractal Geometry: Mathematical Foundations and Applications. ISBN-13: 978-0471922872 (Newer edition: ISBN-13: 978-1119942399)
- P** M. Pollicott. Lectures on ergodic theory and Pesin theory on compact manifolds. ISBN-13: 978-0521435932