

Topics for Math 601D talks.

These are suggestions. They can be changed, swapped or negotiated for other topics. They can be combined with more than one person giving talks on the same subject. The talks should be of length roughly between 1 hour and 1.5 hours.

Please come by my office during the week of Feb. 23 to discuss.

Preferred Topics:

1. Thomas: Shannon-McMillan-Breiman Theorem for ergodic MPT's (Theorem 3.2.7(b) in [K]); for iid processes, this is known as the asymptotic equipartition property in information theory.
2. Ben: Stochastic monotonicity and FKG inequality, with application to existence of μ_β^+ and μ_β^- for Ising model on \mathbb{Z}^2 (pp. 19-24 of [GHM])
3. Raimundo: ergodicity of μ_β^+ and μ_β^-
4. Spencer: Phase transitions for the Ising model on \mathbb{Z}^2 , i.e. for ferromagnetic Ising model and sufficiently large β , $\mu_\beta^+ \neq \mu_\beta^-$ (pp. 109-114 of [K] or pp. 951-955 of [C])
5. Saifuddin: Variational Principle
6. Nishant: Equilibrium states -vs- Gibbs states
7. Felipe: Mixing and Mixing of Higher Orders Ledrappier 3-dot example ([Led] and [Rue]); Weak Mixing
8. Subhajit: Anosov diffeomorphisms, Axiom A diffeomorphisms, with emphasis on examples: hyperbolic toral automorphisms, Smale's horseshoe, and the solenoid attractor (general framework is given in sections 3A,B of Bowen; examples given in section 6.5 of [LM] (which I can loan you) and [Sol])
9. Qiang: Markov Partitions for Anosov and Axiom A, with emphasis on examples (general framework is given in sections 3C,D of Bowen; examples in section 6.5 of [LM])

Other possible topics:

1. other topics in [GHM]
2. Examples of \mathbb{Z}^2 ergodic actions with no ergodic elements and non-mixing \mathbb{Z}^2 actions where every nonzero element is mixing.
3. Weak Mixing and continuous spectrum for MPT's
4. L^p ergodic theorems
5. Ergodic decomposition
6. MP \mathbb{R}^d actions
7. Ergodic endomorphisms of compact groups, e.g. hyperbolic toral autos.

8. ...

References:

[B] R. Bowen, Equilibrium states and the ergodic theory of Anosov diffeomorphisms, Springer Lecture Notes in Mathematics, 470, 1975, reprinted in 2008. The 1975 version can be accessed online through the UBC library.

[C] B. Cipra, An Introduction to the Ising Model; see course website.

[GHM] H-O. Georgii, O. Haggstrom, C. Maes, The random geometry of equilibrium phases; see course website.

[K] G. Keller, Equilibrium States in Ergodic Theory, London Mathematical Society Student Notes, vol. 42, Cambridge U. Press, 1998,

[Led] F. Ledrappier, Un champ markovien peut etre d'entropie nulle et melangeant. C. R. Acad. Sci. Paris Ser. A-B 287 (1978), no. 7, A561 - A563.

[LM] D. Lind and B. Marcus, An introduction to symbolic dynamics and coding, Cambridge, 1995, reprinted 1999.

[Rue] T. de la Rue, 2-fold and 3-fold mixing: why 3-dot-type counterexamples are impossible in one dimension; see course website.

[R] D. Ruelle, Thermodynamic Formalism, Cambridge Mathematical Library, 1978, 2nd edition 2004.

[Sol] [http://en.wikipedia.org/wiki/Solenoid_\(mathematics\)](http://en.wikipedia.org/wiki/Solenoid_(mathematics))

[W] P. Walters, An Introduction to Ergodic Theory, Graduate Texts in Mathematics, v, 79, Springer-Verlag, 1982; earlier (1975) version online.