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Some arguments in equidistribution

- (1) Basic definitions and examples of ergodic theory. Proof of the Poincaré recurrence theorem, Krylov-Bogoliubov theorem, the basic structure of the set of invariant probability measures.
- (2) Ergodicity. Proof of the Von Neumann Ergodic Theorem, The Birkhoff Ergodic Theorem (following Katznelson and Weiss). Ergodicity of some systems via the Fourier expansion.
- (3) Expansion/contraction take 1. Ergodicity of hyperbolic total automorphisms via the Hopf argument. Basics of $SL(2, R)$. Ergodicity of various subgroups on $SL(2, R)/SL(2, Z)$. Mixing and upgrading ergodicity to mixing.
- (4) Expansion/contraction take 2. Three or so arguments to obtain ergodicity in horospherical settings in a very special situation.
- (5) Expansion/contraction take 3. Some of those arguments in more general settings like $SL(2, R)/SL(2, Z)$ and $SL(2, R) \times R^2/SL(2, Z) \times Z^2$.