

**INHOMOGENOUS MARKOV SHIFTS, THEIR SMOOTH  
REALIZATION AND NEW EXAMPLES OF ANOSOV  
DIFFEOMORPHISM**

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Abstract: Markov partitions introduced by Sinai and Adler and Weiss are a tool that enables transferring questions about ergodic theory of Anosov Diffeomorphisms into questions about Topological Markov Shifts and Markov Chains. This talk will be about a reverse reasoning, that gives a construction of  $C^1$  conservative (satisfy Poincare's recurrence) Anosov Diffeomorphism of  $\mathbb{T}^2$  without a Lebesgue absolutely continuous invariant measure. By a theorem of Gurevic and Oseledec, this can't happen if the map is  $C^{1+\alpha}$  with  $\alpha > 0$ . Our method relies on first choosing a nice Toral Automorphism with a nice Markov partition and then constructing bad conservative Markov measure on the symbolic space given by the Markov partition. We then push this measure back to the Torus to obtain a bad measure for the Toral automorphism. The final stage is to find by smooth realization a conjugating map  $H : \mathbb{T}^2 \rightarrow \mathbb{T}^2$  such that  $H \circ F \circ H^{-1}$  with Lebesgue measure is metric equivalent to  $(\mathbb{T}^2, F, \text{Bad Measure})$ .