In this article the authors study ergodic properties of interval exchange transformations. Almost all interval exchange transformations are uniquely ergodic (by work of Masur and Veech), but interval exchange transformations and suspension flows over interval exchange transformations with roof function of bounded variation are never mixing (as Katok has proved). However, Katok and Stepin showed that almost all interval exchange transformations on 3 intervals are weakly mixing. Veech proved almost sure weak mixing for infinitely many irreducible permutations and posed the question whether this property holds for any irreducible permutation which is not a rotation. The authors give an affirmative answer to Veech’s question. They furthermore prove a similar result on the translation flow on translation surfaces: Consider a fixed stratum $H(\kappa)$ (where $\kappa = (\kappa_1, \ldots, \kappa_r)$ specifies the type of the zeroes) of the moduli space of translation surfaces of some fixed genus $g \geq 2$. Then for almost all translation surfaces $(M, \omega) \in H(\kappa)$ and for almost all directions $\theta \in S^1$ the translation flow in direction $\theta$ is weakly mixing. As an important tool for the proof the authors use a renormalization operator. It has the structure of a cocycle (the Zorich cocycle) over the renormalization operator on the space of interval exchange transformations (the Rauzy-Zorich induction). A criterion due to Veech links the dynamics of the renormalization operator with the weak mixing property. An important ingredient used in the proof is Forni’s result on the non-uniform hyperbolicity of the Kontsevich-Zorich cocycle over the Teichmüller flow.

References

5. , Deviation of ergodic averages for area-preserving flows on surfaces of higher genus, Ann. of Math. 155 (2002), 1–103. MR1888794
9. A. B. Katok, Interval exchange transformations and some special flows are not
Note: This list, extracted from the PDF form of the original paper, may contain data conversion errors, almost all limited to the mathematical expressions.

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