

Section 10

Dynamical Systems and Ordinary Differential Equations

Golden Tilings

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In this talk we present the definition of a golden sequence $\{r_i\}_{i \in \mathbb{N}}$. These golden sequences have the property of being Fibonacci quasi-periodic and determine a tiling in the real line. We prove a one-to-one correspondence between:

- (i) affine classes of golden tilings;
- (ii) smooth conjugacy classes of Anosov diffeomorphisms, with an invariant measure absolutely continuous with respect to the Lebesgue measure, that are topologically conjugate to the Anosov automorphism

$$G_A(x, y) = (x + y, x)$$

- (iii) solenoid functions.

A. Pinto and D. Sullivan developed a theory relating 2-adic sequences (Pinto-Sullivan tilings in the real line) with smooth conjugacy classes of doubling expanding circle maps. The solenoid functions give a parametrization of the infinite dimensional space consisting of the mathematical objects described in the above equivalences.

References

- [1] A. A. Pinto, J. P. Almeida and A. Portela, Golden tilings, *accepted for publication in Transactions of the American Mathematical Society*, (2010).
- [2] A. A. Pinto, D. Rand and F. Ferreira, Fine Structures of Hyperbolic Diffeomorphisms, Springer Monograph in Mathematics, (2009).
- [3] A. A. Pinto, D. Rand, Solenoid functions for hyperbolic sets on surfaces, *Recent Progress in Dynamics. MSRI Publications*, **54**, 145–178, (2007).
- [4] A. A. Pinto, D. Rand, Smoothness of holonomies for codimension 1 hyperbolic dynamics, *Bull. London Math. Soc.* **34**, 341–352, (2002).
- [5] A. A. Pinto, D. Rand, Rigidity of hyperbolic sets on surfaces, *J. London Math. Soc.* **2**, 1–22, (2004).
- [6] A. A. Pinto, D. Sullivan, The circle and the solenoid, *Dedicated to A. Katok on the occasion of his 60th birthday, DCDS-A*, **16** (2), 463–504, (2006).



Rigidity and Flexibility of some Group Actions Related to Real-rank One Lie Groups

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By \mathbb{H}^n , we denote the n -dimensional hyperbolic space. Let $\text{Isom}_+(\mathbb{H}^n)$ be the group of orientation preserving isometries of \mathbb{H}^n and B be its Borel subgroup (e.g., the subgroup of elements that fix $\infty \in \partial\mathbb{H}^n \simeq \mathbb{R}^{n-1} \cup \{\infty\}$). For any given cocompact lattice Γ of $\text{Isom}_+(\mathbb{H}^n)$, the group B naturally acts on $\Gamma \backslash \text{Isom}_+(\mathbb{H}^n)$ from right. We denote the action by ρ_Γ .

In this talk, we will discuss about the deformation of ρ_Γ . More precisely, we will give the complete family of the deformation of the above action for $n = 2$ and show the local rigidity for $n \geq 3$.

Theorem A. *Suppose that $n = 2$. Let n_o be the dimension of the Teichmüller space of $\Gamma \backslash \mathbb{H}^2$ and n_p be the first Betti number of $\Gamma \backslash \text{Isom}_+(\mathbb{H}^2)$. Then, there exists a C^∞ family $\{\rho_t\}_{t \in \mathbb{R}^{n_o+n_p}}$ of actions of B on $\Gamma \backslash \text{Isom}_+(\mathbb{H}^2)$ such that*