Both systems heavily rely on the competitive properties of neural fields for performing binding, fusion and disambiguation, whereas synaptic plasticity is employed for storing large amounts of acquired knowledge in a systematic and persistent way. The talk is concluded by an outlook on future investigations, namely using neuro-dynamic systems in autonomous agents, especially in the domain of intelligent vehicles.

References: [1] Cross-module learning as a first step towards a cognitive system concept. First International Conference on Cognitive Systems, 2008.
[2] A neuro-dynamic memory architecture for short-term feature binding capable of real-world operation. Neural Information Processing Systems (NIPS) 2008, submitted.

Dynamical Systems 2.

Date: Tuesday, 10h00

Organizers: Alberto Adrego Pinto (aapinto@math.uminho.pt), Maria Joana Torres (jtorres@math.uminho.pt), Salvatore Cosentino (scosentino@math.uminho.pt)

DS 2.1.

Authors: Vitor Araujo (UFRJ, Brasil)

Title: Multidimensional Rovella-like singular attractors

Abstract: In a joint work with A. Castro, M. Pacifico and V. Pinheiro we present a multidimensional flow exhibiting a Rovella-like attractor: a partially hyperbolic transitive invariant set with a non Lorenz-like singularity accumulated by regular orbits. Moreover, this attractor has a physical measure with full support which is a u-Gibbs state. As in the 3-dimensional Rovella-like attractor, this example is not robust. The construction introduces a natural class of multidimensional dynamics to which the Benedicks-Carleson arguments can be applied to get persistent non-uniform expansion along the multidimensional central direction.

DS 2.2.

Authors: A. Pinto (Univ. do Minho), J.P. Almeida (U. Minho, Portugal), A. Portela (Univ. de Montevideo)

Title: Golden Tilings

Abstract: A. Pinto and D. Sullivan [3] proved a one-to-one correspondence between: (i) C^{1+} conjugacy classes of expanding circle maps; (ii) solenoid functions and (iii) Pinto-Sullivan's dyadic tilings on the real line. Here, we prove a one-to-one correspondence between: (i) golden tilings; (ii) smooth conjugacy classes of golden diffeomorphism of the circle that are fixed points of renormalization; (iii) smooth conjugacy classes of Anosov difeomorphisms, with an invariant measure absolutely continuous with respect to the Lebesgue measure, that are topologically conjugated to the Anosov automorphism $G(x, y) = (x + y, x)$ and (iv) solenoid functions.

The solenoid functions give a parametrization of the infinite dimensional space consisting of the mathematical objects described in the above equivalences. In this case, the expanding dynamics are hidden in the renormalization operator that acts on the minimal set. The link between Anosov diffeomorphisms and diffeomorphisms of the circle, that are smooth fixed points of renormalization, is due to D. Sullivan and E. Ghys. The renormalization operator appears inspired in the works of Feigenbaum and Lanford. Pinto-Rand [2] proved the equivalence between (i) and (ii). Here, we present the renormalization in a new way, using the construction of a train-track, as an intermediate step (see also Pinto-Rand [2]). The train-track appears as in the works of Thurston, Penner, Williams and Veech, but with a new and relevant feature that corresponds to have a C^{1+} structure associated to it. Here we explicit the definition of golden tilings. The properties of the golden tilings are described using a Fibonacci decomposition for the natural numbers.

nces: and Literature for Further Reading

[1] A. A. Pinto, J. P. Almeida, A. Portela, Golden tilings, submitted.
[2] A. A. Pinto, D. Rand, Renormalisation gives all surface Anosov diffeomorphisms with a smooth invariant measure, submitted.
[3] 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).

3.

rs: Jorge Milhazes Freitas, Mike Todd (CMUP)

Statistical stability for equilibrium states

ct: We consider multimodal interval maps with at least polynomial growth of the derivative along the critical orbit. For these maps Bruin and Todd showed the existence and uniqueness of equilibrium states for the potential $\varphi_t : x \to -t \log |Df(x)|$, for t close to 1. We show that for certain families of this type of maps the equilibrium states vary continuously in the weak* topology, when we perturb the map within the respective family. Moreover, in the case $t = 1$, when the equilibrium states are absolutely continuous with respect to Lebesgue, we show that the densities also vary continuously in the L_1-norm.

ırds: Statistical stability; equilibrium states.

nces: [BT] H. Bruin, M. Todd, Equilibrium states for interval maps: the potential - $t \log |Df|$, Preprint, arXiv:0704.2199.
[FT] J.M. Freitas, M. Todd, Statistical stability of equilibrium states for interval maps, Preprint, arXiv:math/0709.1395.

4.

rs: Miguel Mendes (FEUP, Portugal)

Codings of trajectories in certain discontinuous map