Centro de **Matemática**
Universidade do Porto

Dynamical Systems Seminar

Date. March 8, 14h30

Place. Room M031

Speaker. Joana Torres[1] (CMAT - Universidade do Minho)

Title. Stability and Shades of Hyperbolicity for Hamiltonians

Abstract. We consider the setting of Hamiltonian systems $H \in C^2(M, \mathbb{R})$, defined on a $2d$-dimensional symplectic manifold M ($d \geq 2$). We address the following results, that we proved recently:

- A Hamiltonian star system is Anosov. As a consequence we obtain the proof of the stability conjecture for Hamiltonians. This generalizes the 4-dimensional results in [1].

- A Hamiltonian system H is Anosov if any of the following statements holds: H is robustly topologically stable; H is stably shadowable; H is stably expansive; and H has the stable weak specification property. Moreover, for a C^2-generic Hamiltonian H, the union of the partially hyperbolic regular energy hypersurfaces and the closed elliptic orbits, forms a dense subset of M. As a consequence, any robustly transitive regular energy hypersurface of a C^2-Hamiltonian is partially hyperbolic. Finally, stably weakly shadowable regular energy hypersurfaces are partially hyperbolic.

Joint work with Mário Bessa and Jorge Rocha.

References

[1] M. Bessa, C. Ferreira and J. Rocha, *On the stability of the set of hyperbolic closed orbits of a Hamiltonian*, Math. Proc. Cambridge Philos. Soc., 149 (2) (2010), 373–383.

[2] M. Bessa, J. Rocha and M.J. Torres, *Hyperbolicity and Stability for Hamiltonian flows*, Jr. Diff. Eq., 254 (1) (2013), 309–322.

[3] M. Bessa, J. Rocha and M.J. Torres, *Shades of Hyperbolicity for Hamiltonians*, arXiv:1212.4874.

Remark. Coffee with the speaker is served after the talk (15h30 - 16h00)

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[1] Joana Torres is Professor Auxiliar at Universidade do Minho in Braga. Joana graduated in Mathematics at Universidade do Porto in 1996, where she also obtained where M.Sc. degree in Applied Mathematics (Dynamical Systems) in 1998. She obtained her Ph.D. at Universidade de Lisboa in 2004, under the supervision of Pedro Duarte. Her main scientific research interests are Dynamical Systems.

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