

IV EPA Dinâmica

06 de Novembro de 2015 (Sexta-feira)

Sala Nobre 144-B (IME - USP)

10h

“The dynamics of the forced damped pendulum”

Prof. Dr. John Hubbard (Cornell University)

11h

“Dynamical properties of expansions in non-integer bases”

Rafael Alcaraz Barrera (IME - USP)

14h

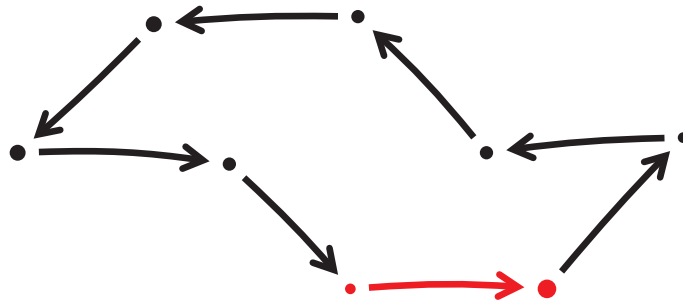
“Ações de Anosov associada a pares de contato”

Uirá Matos de Almeida (ICMC - USP)

15h

“Tilted excitation imply odd periodic resonances”

Gabriela Depetri (IF - USP)



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Seminário 10h

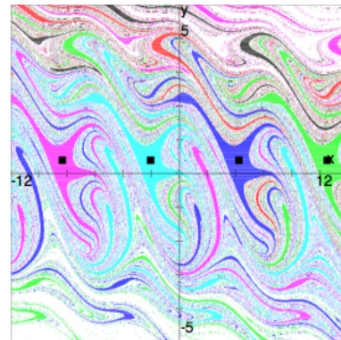
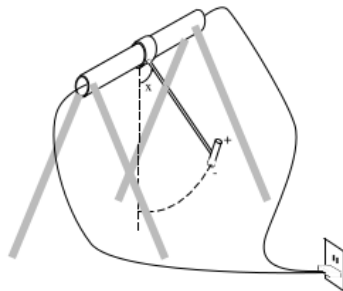
“The dynamics of
the forced damped pendulum”

Prof. Dr. John Hubbard
(Cornell University)

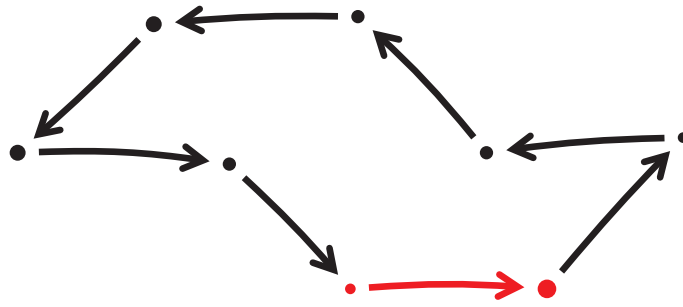
We can think of the pendulum as a physical object, or as the equation

$$x'' + ax' + b \sin x = c \cos t$$

or as the pictures



We will explain what this picture has to do with motions of the pendulum. We will further explain why this means that these motions are chaotic. This means that the pendulum is controllable. Since the pendulum is the building block of every robot controlling it is the basic subroutine of robot control. This is not well understood at present.



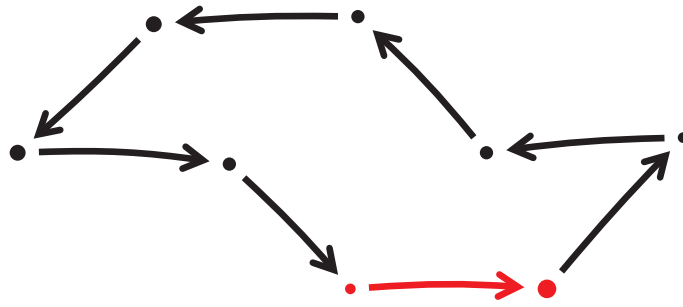
IV EPA Dinâmica

Seminário 11h

“Dynamical properties of
expansions in non-integer bases”

Rafael Alcaraz Barrera
(IME - USP)

Problems related to the expansions of real numbers in non-integer bases, colloquially β -expansions, have been systematically studied since the late 1950's, starting with the seminal works by Rényi and Parry. During this talk we will study some recent progress on the dynamical properties of the univoque set, i.e. the set of x such that x has a unique β -expansions for a given β . Some of this work in progress with S. Baker and D. Kong.



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Seminário 14h

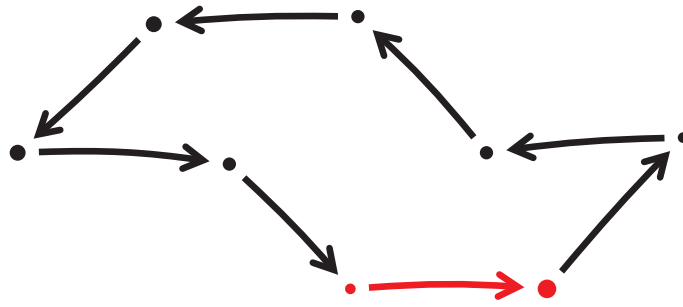
“Ações de Anosov
associada a pares de contato”

Uirá Matos de Almeida
(ICMC - USP)

Os fluxos de Anosov-contato constituem um importante exemplo na teoria clássica dos sistemas dinâmicos e Yves Benoist, Patrick Foulon e François Labourie [BFL] provaram em 1992 um forte teorema de classificação. Neste seminário, proponho estabelecer um análogo dos fluxos de Anosov-contato para o caso de ação de Anosov de \mathbb{R}^2 , as ações de Anosov associadas a pares de contato e apresentar o esboço da demonstração de um teorema de classificação análogo ao demonstrado por [BFL].

Referência:

[BFL] Y. Benoist, P. Foulon e F. Labourie, Flots d’Anosov à distributions stable et instable différentiables, *Journal of the American Mathematical Society* **5** (1992), 33–74.



IV EPA Dinâmica

Seminário 15h

“Tilted excitation imply
odd periodic resonances”

Gabriela Depetri
(IF - USP)

The parametrically excited pendulum offers a paradigmatic model to comprehend the main fundamental mechanisms for the appearance of resonances in other more complex systems. This work aims at the understanding of how resonances of a parametrically driven pendulum are affected as we break its symmetry, by exciting it harmonically along a tilted direction. We have shown numerically, experimentally, and theoretically that odd subharmonic resonances appear for large parameter ranges, a behaviour that is atypical to be observed when the pendulum is excited along the vertical direction. Therefore, the symmetry plays an important role in such resonant behaviour.