



Mathematics and CS Seminar

Instability in the Solar system and Arnold diffusion

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In 1964, V. Arnold constructed an example of a nearly integrable deterministic system exhibiting instabilities. In the 1970s, physicist B. Chirikov coined the term for this phenomenon Arnold diffusion, where diffusion refers to stochastic nature of instability. One of the most famous examples of stochastic instabilities for nearly integrable systems is dynamics of Asteroids in Kirkwood gaps in the Asteroid belt. The deepest Kirkwood gaps are located at 3:1, 5:2, 7:3 resonances. For the 3:1 gap the astronomer J. Wisdom proposed an heuristic explanation based on numerical experiments. We would like to give a different heuristic explanation for other Kirkwood gaps based on the phenomenon of Arnold diffusion. Moreover, we take an insight into stochastic structure of Kirkwood gap instabilities for a model example. It turns out that dynamics of large set of orbits there can be described using a stochastic diffusion process. A general discussion of Arnold diffusion for convex Hamiltonian systems will follow.

Wednesday, January 17, 2018 09:00am - 10:00am

Big Seminar room Ground floor / Office Bldg West (I21.EG.101)



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