

NYC Dynamics Seminar at CUNY & Yeshiva University

Albert Granados (Technical University of Denmark)

will speak on

Invariant Manifolds in energy harvesting piezoelectric oscillators

Wednesday, November 2nd, 5:00pm

Lectures will last 1 hour and be followed by questions and/or discussion.

Yeshiva University, 215 Lexington Ave, Room 506

On the SW corner of Lexington Ave and 33rd Street. You will need to sign in.

Abstract:

When perturbed with a small periodic forcing, two (or more) coupled conservative oscillators can exhibit instabilities: trajectories that become unstable while accumulating “unbounded” energy from the source. This is known as Arnold diffusion, and such phenomenon could be extremely useful in energy harvesting systems, whose aim is to capture as much energy as possible from a source.

In this talk we consider an energy harvesting system based on two piezoelectric oscillators. When forced to oscillate, for instance when driven by a small periodic vibration, such oscillators create an electrical current which charges an accumulator (a capacitor or a battery). Unfortunately, such oscillators are not conservative, as they are not perfectly elastic (they are damped). Moreover, the piezoelectric coupling effects slows them down. However, we will discuss how to apply some of the techniques from Arnold diffusion theory to benefit the accumulation of energy in such devices.