

Topology, Arithmetic, & Dynamics Seminar

Can rotation numbers be computed from a quasiperiodic trajectory?

Evelyn Sander

Department of Mathematical Sciences
George Mason University

A trajectory is quasiperiodic if the trajectory lies on and is dense in some d -dimensional torus, and there is a choice of coordinates on the torus for which F has the form $F(t) = t + r \pmod{1}$ for all points in the torus, and for some r in the torus. There is an extensive literature on determining the coordinates of the vector r , called the rotation numbers of F . However, even in the one-dimensional case there has been no general method for computing the vector r given only the trajectory (u_n) , though there is an extensive literature dealing with special cases. I will present a computational method called the Embedding Continuation Method for computing some components of r from a trajectory. It is based on the Takens Embedding Theorem and the Birkhoff Ergodic Theorem. There is however a caveat; the coordinates of the rotation vector depend on the choice of coordinates of the torus. I will give a statement of the various sets of possible rotation numbers that r can yield. I will illustrate these ideas with one- and two-dimensional examples. This talk will be at a level accessible to students.

Date: Friday, September 8, 2017

Time: 2:30-3:20 pm

Place: 4106 Exploratory Hall

For special accommodations, please contact Sean Lawton via email at slawton3@gmu.edu.