

Northern California Symplectic Geometry Seminar

BERKELEY – DAVIS – SANTA CRUZ – STANFORD

Monday, February 8th, 2021

at Santa Cruz (virtually)

1–2pm, on Zoom

Rich Schwartz (Brown University)

Inscribing rectangles in Jordan curves

Abstract: The notorious square peg problem asks if every Jordan curve has an inscribed square – i.e., 4 points which make the vertices of a square. I don't know how to solve this problem but I will explain my result that all but at most 4 points of any Jordan curve are vertices of inscribed rectangles, and show lots of computer pictures. I'll also discuss the recent results of Josh Greene and Andrew Lobb about these kinds of problems – results which make a connection between inscribed rectangles and Lagrangian Klein bottles.

2:30–3:30pm, on Zoom

Julian Chaidez (University of California, Berkeley)

Convex contact forms and the Ruelle invariant

Abstract: The boundary of a strictly convex domain in 4-space is equipped with a natural contact form acquired by restricting the standard radial Liouville form. A contact form on the 3-sphere is called dynamically convex if every Reeb orbit has Conley-Zehnder index greater than or equal to 3. Every contact form arising by restriction of the standard Liouville form to the boundary of a strictly convex domain is dynamically convex. It has been a longstanding open problem to determine if, conversely, every dynamically convex contact form arises in this way.

In this talk, I will explain my recent joint work with Oliver Edtmair constructing dynamically convex contact forms on the 3-sphere that are **not** convex. Our main tool is a bound on the Ruelle invariant, which can be viewed as a sort of spacetime averaged rotation number or Conley-Zehnder index. We construct dynamically convex contact forms that violate this bound using methods of Abbondandolo-Bramham-Hryniewicz-Salomão.

Please contact dcristof@ucsc.edu for the Zoom info.

Organizers: R. Casals, Y. Eliashberg, D. Fuchs, D. Gardiner, V. Ginzburg, M. Hutchings, E. Ionel, R. Montgomery, V. Shende, L. Starkston, K. Wehrheim, A. Weinstein