

## Seminar in Nonlinear Systems

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### *On entropy of real quartic polynomials*

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4:00 pm

Pierce 218

*Abstract:* Maps on the interval provide the simplest examples that illustrate how dynamic complexity evolves under deformations of a dynamical system. A particularly useful measure of the “complexity” of a continuous self-map is provided by the topological entropy.

However, even the basic problem of comparing the entropies of two smooth interval maps which are close to each other is only partially understood. The theory is most complete in the particular case of the family of quadratic maps  $Q_v(x) = 4vx(1-x)$ , acting on  $[0, 1]$ , parametrized by the value  $0 \leq v \leq 1$ .

One would like to understand as much as possible of the global bifurcation theory for polynomials of higher degree. But there, concepts are harder to isolate because families of degree  $d$  polynomials depend naturally on  $d-1$  parameters. For these families we generalize the monotonicity of topological entropy when  $d=2$  to the connectedness of the level sets, which we call isentropes. The result for the case  $d=3$  has been proved in a paper by J. Milnor and C. Tresser. The last part of this talk will discuss the *Connected Isentrope Conjecture* in a case of degree  $d=4$ .

Refreshments at 3:50pm