A priori bounds for unimodal diffeomorphisms in dimension two

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Abstract
One of the most fundamental examples of non-linear dynamics is given by the class of unimodal interval maps. It is the simplest setting in which one can study the behavior of a critical orbit and the profound impact it has on the geometry of the system. By the works of Sullivan, McMullen and Lyubich, we have a complete renormalization theory for these maps, and as a result, their dynamics is now very well understood.

In this talk, we discuss the extension of this theory to a higher dimensional setting- namely, to properly dissipative diffeomorphisms in dimension two. Using the notion of non-uniform partial hyperbolicity, we identify what it means for such maps to be "unimodal." Then we show that properly dissipative infinitely renormalizable unimodal diffeomorphisms have a priori bounds (a certain uniform control on their geometry that holds at arbitrarily small scales).

This is based on a joint work with S. Crovisier, M . Lyubich and E. Pujals.