## The obstruction criterion for non existence of invariant circles and renormalization

Rafael de la Llave<sup>1</sup>

<u>Arturo Olvera<sup>2</sup></u>

- 1 Department of Mathematics The University of Texas at Austin TX 78712-1082.
- 2 Departamento de Matemáticas y Mecánica IIMAS – UNAM México D.F., 04510.

## Abstract

We formulate a conjecture which supplements the standard renormalization scenario for the breakdown of golden circle in twist maps.

We show rigorously that if the conjecture was true then the stable manifold of the non-trivial fixed point would be part of the boundary between the existence of smooth invariant tori and hyperbolic orbits with golden mean rotation number. In particular, the boundary of the set of twist maps with a torus with a golden mean rotation number would include a smooth submanifold in the space of analytic mappings.

Moreover, if the conjecture was true, in the domain of universality, we would have the following: the obstruction criterion for non-existence of golden mean invariant circle is sharp [1]. That is, for maps in the universality class either there is a golden invariant circle or the obstruction criterion for non-existence of golden circles applies. If there is no invariant circle, there are hyperbolic sets with golden mean rotation number.

## References

 A. Olvera and C. Simó. Obstruction Method for the Destruction of Invariant Curves. *PhysicaD.*, 26:181–192, 1987.