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Title: On Carles Simó's problem on weakly hyperbolic tori and related topics

Abstract:

In 2016, on occasion of his retirement Carles Simó gave a lecture where he presented a series of 22 problems of Dynamical Systems. The tenth one was devoted to the existence and computation of invariant manifolds of a torus for a class of differential equations with an invariant torus for which the transversal dynamics was governed by a linear part multiplied by a function of some order bigger that 1 (the same for each component) plus higher order terms.

Later, these problems were published as a paper: C. Simó. Some questions looking for answers in dynamical systems, DCDS, 38 (2018), 6215-6239.

In this talk we will show how to compute approximations of the mentioned invariant manifolds to any order, and that, under some conditions, near these approximations there are true invariant manifolds. The existence result follows form a more general result on existence of invariant manifolds for invariant tori both for maps and differential equations we have obtained recently generalizing the ones in: I. Baldomá; E.F.; P. Martín. Whiskered parabolic tori in the planar (n+1)-body problem. Comm. Math. Phys. 374 (2020), no. 1, 63–110.

This is joint work with Inma Baldomá and Pau Martín.