

DARBOUX RELATIVE EXACTNESS AND PSEUDO-ABELIAN INTEGRALS

COLIN CHRISTOPHER AND PAVAO MARDEŠIĆ

ABSTRACT. We present results from a joint work on Darboux relative exactness. We consider polynomial planar foliations having a Darboux first integral and their deformations.

Inspired by Ilyashenko's seminal paper about deformations of systems having a polynomial first integral, we define Darboux relatively exact forms for which the first order Melnikov function M_1 of the displacement function Δ vanishes. Note that M_1 is given by a pseudo-abelian integral.

We show that, under generic conditions on the undeformed system, the first Melnikov function M_1 vanishes if and only if the deformation is Darboux relatively exact.

We present different corollaries of the above result and perspectives.

The result will be presented in a series of four lectures:

Lecture 1: Pavao Mardešić: Main results, idea of the proof, transport of the cycles and monodromy.

Lecture 2: Colin Christopher: Formulation and proof of the corollaries

Lecture 3: Colin Christopher: Proof of the theorem in the special line case

Lecture 4: Pavao Mardešić: Proof in the general case, conclusions and perspectives.