

# Invariants and reversibility in polynomial systems of ODEs

Mateja Grašič

Joint work with Prof. Valery G. Romanovski.

## Abstract

We first investigate the interconnection of invariants of certain group actions and time-reversibility of a class of two-dimensional polynomial systems with  $1 : -1$  resonant singularity at the origin. The time-reversibility is related to the Sibirsky subvariety of the center (integrability) variety and it is known that every time-reversible system has a local analytic first integral at the origin. We propose a new algorithm to obtain a generating set for the Sibirsky ideal of such polynomial systems and investigate some algebraic properties of this ideal. Then, we discuss a generalization of the concept of time-reversibility in the three dimensional case considering the systems with  $1 : \zeta : \zeta^2$  resonant singularity at the origin (where  $\zeta$  is a primitive cubic root of unity) and study a connection of such reversibility with the invariants of some group actions in the space of parameters of the system.