

UNIVERSIDADE FEDERAL DE SÃO CARLOS  
DEPARTAMENTO DE MATEMÁTICA

COLÓQUIOS DO DM-UFSCAR

Leonardo P.C. da Cruz  
(DM-UFSCar)

Falará sobre

## Simultaneous bifurcation of limit cycles from a cubic piecewise center with two period annuli

We study the number of periodic orbits that bifurcate from a cubic polynomial vector field having two period annuli via piecewise perturbations. The cubic planar system  $(x', y') = (-y((x - 1)^2 + y^2), x((x - 1)^2 + y^2))$  has simultaneously a center at the origin and at infinity. We study, up to first order averaging analysis, the bifurcation of periodic orbits from the two period annuli, first separately and second simultaneously. This problem is a generalization of [1] to the piecewise systems class. When the perturbation is cubic, the same degree as the unperturbed vector field, the maximum number of limit cycles, up to first order perturbation, from the inner and outer annuli is 9 and 8, respectively. When the simultaneous bifurcation problem is considered, 12 limit cycles exist. These limit cycles appear in three types of configurations: (9,3), (6,6) and (4,8). In the non-piecewise scenario, only 5 limit cycles were found.

References: S. PÉREZ-GONZÁLEZ AND J. TORREGROSA, *Simultaneous bifurcation of limit cycles from a linear center with extra singular points*, Bull. Sci. Math. **138**, (2014) 124–138.

Data: 27 de março de 2019

Horário: 16h

Local: Auditório do DM