

Unfoldings of Limit Cycles in Families of Centers

Joan Torregrosa

Universitat Autònoma de Barcelona - Cerdanyola del Vallès (Barcelona) - Spain
JOAN.TORREGROSA@UAB.CAT

Abstract

Classical bifurcation mechanisms, such as degenerate Hopf bifurcation, Melnikov theory, and the averaging method, provide lower bounds for the number of limit cycles that a planar polynomial vector field of fixed degree can exhibit. Typically, the analysis focuses on a single center. In this talk, we show how exploiting families of centers can increase these lower bounds. In particular, we investigate how the cyclicity depends on the specific point within a connected component of centers. We present several examples, in both smooth and nonsmooth settings, illustrating this phenomenon under different perturbation techniques, near center points and heteroclinic connections.