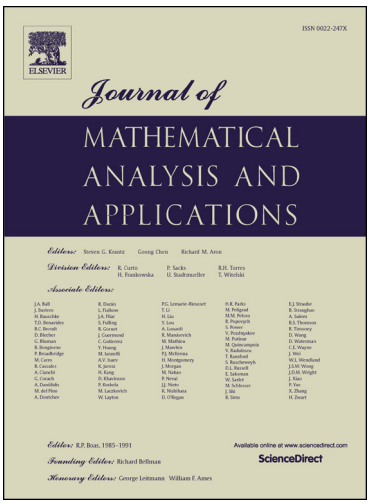
Accepted Manuscript



Bifurcation of 2-periodic orbits from non-hyperbolic fixed points

Anna Cima, Armengol Gasull, Víctor Mañosa

PII: S0022-247X(17)30786-2
DOI: http://dx.doi.org/10.1016/j.jmaa.2017.08.029
Reference: YJMAA 21636

To appear in: *Journal of Mathematical Analysis and Applications*

Received date: 20 July 2017

Please cite this article in press as: A. Cima et al., Bifurcation of 2-periodic orbits from non-hyperbolic fixed points, *J. Math. Anal. Appl.* (2017), http://dx.doi.org/10.1016/j.jmaa.2017.08.029

Bifurcation of 2-periodic orbits from non-hyperbolic fixed points *

Anna Cima[(1)], Armengol Gasull[(1)] and Víctor Mañosa [2]

[(1)] *Departament de Matemàtiques, Facultat de Ciències, Universitat Autònoma de Barcelona, 08193 Bellaterra, Barcelona, Spain*
cima@mat.uab.cat, gasull@mat.uab.cat

[2] *Departament de Matemàtiques, Universitat Politècnica de Catalunya Colom 1, 08222 Terrassa, Spain*
victor.manosa@upc.edu

August 18, 2017

Abstract

We introduce the concept of 2-cyclicity for families of one-dimensional maps with a non-hyperbolic fixed point by analogy to the cyclicity for families of planar vector fields with a weak focus. This new concept is useful in order to study the number of 2-periodic orbits that can bifurcate from the fixed point. As an application we study the 2-cyclicity of some natural families of polynomial maps.

Mathematics Subject Classification 2010: 37C05, 37C25, 37C75, 39A30.
Keywords: non-hyperbolic fixed point, two periodic points, bifurcation, cyclicity.

1 Introduction

The cyclicity of a family of vector fields having a weak focus or a center is a well known concept in the theory of planar vector fields and the problems surrounding the second part of the Hilbert's 16th problem [11, 16]. A grosso modo the cyclicity expresses the maximum

*The authors are supported by Ministry of Economy, Industry and Competitiveness of the Spanish Government through grants MINECO/FEDER MTM2016-77278-P (first and second authors) and DPI2016-77407-P (AEI/FEDER, UE, third author). The first and second authors are also supported by the grant 2014-SGR-568 from AGAUR, Generalitat de Catalunya. The third author is supported by the grant 2014-SGR-859 from AGAUR, Generalitat de Catalunya.