**Palmer, Kenneth J.**

**Transversal periodic-to-periodic homoclinic orbits.** (English) Zbl 1187.34002

Battelli, Flaviano (ed.) et al., Handbook of differential equations: Ordinary differential equations. Vol. IV. Amsterdam: Elsevier/North Holland (ISBN 978-0-444-53031-8/hbk). Handbook of Differential Equations, 365-439 (2008).

The paper is the fourth chapter of the fourth volume [F. Battelli (ed.) et al., Handbook of differential equations: Ordinary differential equations. Vol. IV. Amsterdam: Elsevier/North Holland. Handbook of Differential Equations, (2008; Zbl 1173.34001)] in a series of volumes devoted to self-contained and up-to-date surveys in the theory of ordinary differential equations. The paper is devoted to the detailed study of the dynamics of systems covered by ordinary differential equations in the case of the presence of transversal periodic-to-periodic homoclinic orbits. The paper's contents can be viewed from the section titles listed below.

1. Introduction
2. Trichotomies
3. Hyperbolic periodic orbits and their stable and unstable mannifolds
4. Homoclinic orbits
5. Robustness of transversal periodic-to-periodic homoclinic orbits
6. Finding transversal periodic-to-periodic homoclinic orbits through regular perturbation
7. Finding transversal periodic-to-periodic homoclinic orbits through numerical shadowing

Carefully written and with detailed proofs, the paper will be useful both for mathematicians and scientists of many related fields. It corresponds to the current state of investigations on the subject.

For the entire collection see [Zbl 1173.34001].

Reviewer: Eugene Ershov (St. Petersburg)

**MSC:**

34-02 Research exposition (monographs, survey articles) pertaining to ordinary differential equations
34C37 Homoclinic and heteroclinic solutions to ordinary differential equations
34C28 Complex behavior and chaotic systems of ordinary differential equations
37D45 Strange attractors, chaotic dynamics of systems with hyperbolic behavior

**Keywords:**

hyperbolic periodic orbits; transversal homoclinic orbits; numerical shadowing; chaos; stable and unstable manifolds