	doc_1	doc_2	decision	id
cases			DUPLICATES	402

doc_1

authors	• Roberto Castelli • Jean-Philippe Lessard
title	Rigorous numerics in Floquet theory: computing stable and unstable bundles of periodic orbits
publication_date	2011-12-20 23:00:29+00:00
source	SupportedSources.ARXIV
journal	None
volume	
doi	
urls	• http://arxiv.org/pdf/1112.4874v1 • http://arxiv.org/abs/1112.4874v1 • http://arxiv.org/pdf/1112.4874v1
id	id1264179137467551809
abstract	In this paper, a new rigorous numerical method to compute fundamental matrix solutions of non-autonomous linear differential equations with periodic coefficients is introduced. Decomposing the fundamental matrix solutions $\Phi(t)$ by their Floquet normal forms, that is as product of real periodic and exponential matrices $\Phi(t)=Q(t)e^{Rt}$, one solves simultaneously for R and for the Fourier coefficients of Q via a fixed point argument in a suitable Banach space of rapidly decaying coefficients. As an application, the method is used to compute rigorously stable and unstable bundles of periodic orbits of vector fields. Examples are given in the context of the Lorenz equations and the ζ^3-model.
versions	

doc_2

authors	• R. Castelli • J. Lessard
title	Rigorous Numerics in Floquet Theory: Computing Stable and Unstable Bundles of Periodic Orbits
publication_date	2011-12-20 00:00:00
source	SupportedSources.SEMANTIC_SCHOLAR
journal	SIAM J. Appl. Dyn. Syst.
volume	12
doi	10.1137/120873960
urls	• https://www.semanticscholar.org/paper/c3e5cc8551109a6a75b6c4301b96fa71776a52a1
id	id-927241914778945999
abstract	In this paper, a rigorous method to compute Floquet normal forms of fundamental matrix solutions of nonautonomous linear differential equations with periodic coefficients is introduced. The Floquet normal form of a fundamental matrix solution $\Phi(t)$ is a canonical decomposition of the form $\Phi(t)=Q(t)e^{Rt}$, where $Q(t)$ is a real periodic matrix and R is a constant matrix. To rigorously compute the Floquet normal form, the idea is to use the regularity of $Q(t)$ and to simultaneously solve for R and $Q(t)$ with the contraction mapping theorem in a Banach space of rapidly decaying coefficients. The explicit knowledge of R and Q can then be used to construct, in a rigorous computer-assisted way, stable and unstable bundles of periodic orbits of vector fields. The new proposed method does not require rigorous numerical integration of the ODE.
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