

NUMERICAL DYNAMICAL SYSTEMS ANALYSIS OF NONLINEAR CLIMATE MODELS

HENK A. DIJKSTRA^{*}, KURT W.A. LUST[†]
AND FRED W. WUBS[†]

^{*} Institute for Marine and Atmospheric research Utrecht, University Utrecht
Princetonplein 5, NL-3584 CC Utrecht
dijkstra@phys.uu.nl

[†] Research Institute for Mathematics and Computing Science
Blauwborgje 3, NL-9747 AC Groningen
{kurt,wubs}@math.rug.nl

Key words: Bifurcation analysis, Infinite dimensional problems, Sparse (non)linear systems, Climate feedbacks, Dynamical systems.

ABSTRACT

Climate models display many interesting nonlinear phenomena such as rapid transitions, nonlinear resonance, regime switches and chaotic behavior. For an understanding of these phenomena the application of numerical techniques from dynamical systems theory (bifurcation analysis, attractor reconstruction, etc.) has shown to be very fruitful. In this symposium, we want to bring together experts on the numerical techniques used in the analysis of nonlinear dynamical systems and climate physicists. The focus will be on high dimensional systems originating from the discretization of partial differential equations. The aim is to broaden the scope of both groups of experts in terms of the available techniques and potentially interesting applications.

For any further information, please contact

Fred Wubs

wubs@math.rug.nl

REFERENCES

- [1] H.A. Dijkstra, *Nonlinear Physical Oceanography*, Springer Atmospheric and Oceanographic Library Series, 2nd revised and enlarged edition, 532 pp., New York, USA, 2005.
- [2] K. Lust and D. Roose, Computation and bifurcation analysis of periodic solutions of large-scale systems. In E. Doedel and L.S. Tuckerman, editors, *Numerical Methods for Bifurcation Problems and Large-Scale Dynamical Systems*, volume 119 of IMA Volumes in Mathematics and its Applications, Springer-Verlag, 2000.
- [3] G. Tiesinga, F.W. Wubs, A.E.P. Veldman, Bifurcation analysis of incompressible flow in a driven cavity by the Newton-Picard method, *J. Comput. Appl. Math.*, 140, pp 751-772, 2002.