2013, October the 14th, Evian (France)

naXys
Namur Center for Complex Systems

UNIVERSITÉ DE NAMUR

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naXys & Department of Mathematics
University of Namur, Belgium

Outline

- Introducing myself
- Introducing naXys
- Some figures about naXys
- Some running projects

Some informations about me :

- Master Degree in Physics
- PhD Mathematics
- Professor at the Math Dep UNamur
- Director of naXys
- PhD Thesis title:

"*Stability of orbits and Arithmetics for some discrete dynamical systems*"

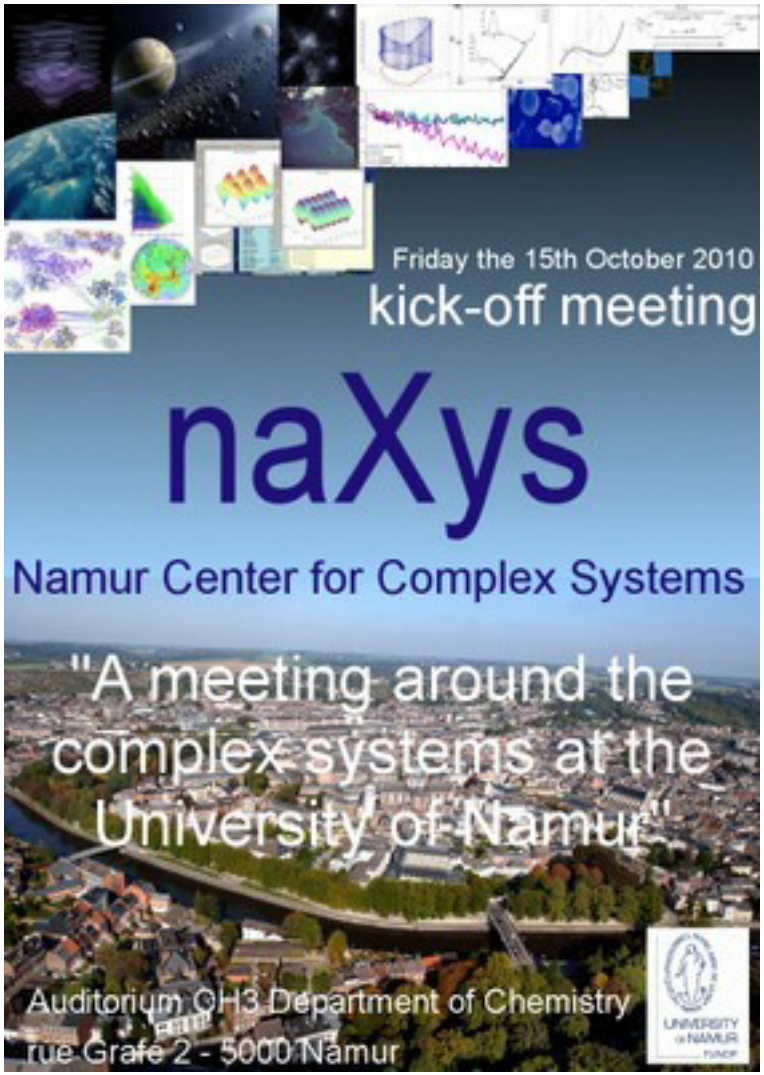
- Most cited paper:

T.C., S. Marmi, *Linearization of Analytic and Non-Analytic Germs of Diffeomorphisms of (C,0)*, Bulletin SMF, **128**, (2000), pp. 69-85

Some informations about naXys :

- Created in 2010, because of a strong will of researchers from the Department of Mathematics to reorganize their activities in a large and unique research axis: **the complex systems**.

Kick off meeting



9h00 Opening and Introduction

9h30 The Mathematics of Emergence *Robert MacKay Warwick (UK)*

10h20 Complex systems in optics *Y.Caudano FUNDP*

11h10 Nonlinear dynamics of biological rhythms *A. Goldbeter, ULB*

12h00 Paraconsistant logic: from topology to robot ethics, *D. Lambert, FUNDP*

14h00 Innovation and sustainability *D. Lane, University of Modena and Reggio Emilia, (It)*

14h50 Spatial-temporal complexities and social-environmental systems: some examples *C. Fontaine, FUNDP*

15h40 Cubic regularization and complexity issues for non convex optimization *Ph. Toint, FUNDP*

16h00 Dynamics of and on complex networks *C. Magnien, Univ. Curie Paris (F)*

16h50 conclusions and "cheese and beer party"

Some informations about naXys :

- The goals of naXys are: reach a **critical mass** capable to attract human and financial resources, to **share knowledge** and **tools**, develop new **collaborations** and **projects**, to propose a **high-level formation** to students, PhD and post-doct.
- naXys accounts for ~60 members (2/3 from math), several faculties and departments
- Seminars cycle, Technical Report Series, visiting program, web site **www.naxys.be**

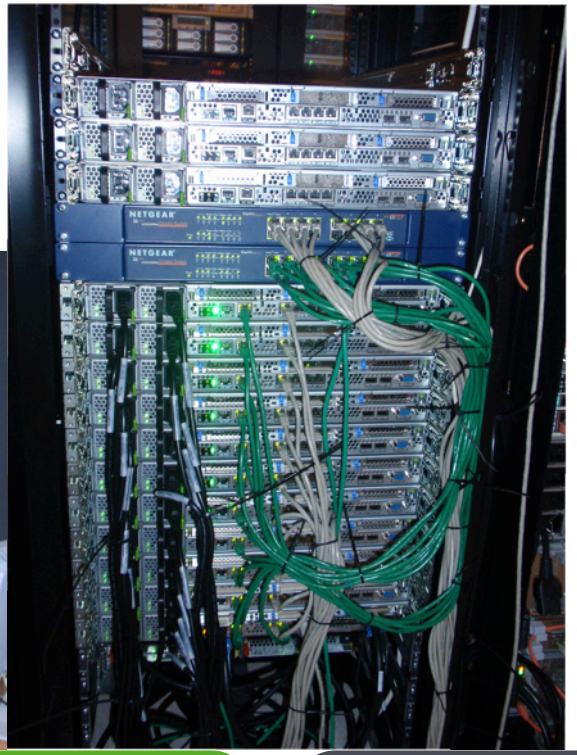
naXys in the Belgian landscape

- CENOLIS (ULB) : physics and chemistry
- COMPLEXYS (Umons): computer science
- naXys : strong core of applied mathematicians & social sciences and economics components.
- Modeling – Analyzing – Experimenting/Simulating

Unique in Belgium!

resources

- UNamur (salaries, physical spaces, infrastructures, …)
- Belgium (Regions, FNRS, BELSPO, …)
- EU (FP7, COST, …)
- High Performance Scientific Computing cluster



But “not everything glittering is gold” …

- Difficulties to have some projects funded, whenever classical disciplines divisions hold
- Difficulties to create a commonly shared language understandable by all the colleagues, despite their background
- The large number of involved mathematicians, makes difficult to differentiate naXys from the Department of mathematics

We are thinking of a reorganization of naXys

Some research axes & keywords

ARCCOS
Complexity in cosmology

biomedx
Biology, medicine and complex systems

dynamix
Dynamical systems and complex systems

sox
Social sciences, economics and complex systems

xn
Complex networks

...

Some keywords:
ABM, large data, HPC, models, numerical simulations, proof, …

Some research axes & keywords

ARCCOS
Complexity in cosmology

Cosmology
Large scale study of the universe and its history

Themes
Big Bang theory, dark matter, dark energy, primordial universe, galaxies formation, nature of gravitation, philosophical questions, quantum mechanics interpretation, …

Astrophysics, differential geometry, dynamical systems, chaos theory, HPC, Monte Carlo methods, non commutative geometry, …

Some research axes & keywords

biomedx
Biology, medicine and complex systems

Mathematical models of biological phenomena with application to medicine

Themes
Biofilm, bioreactor, brain and network, (proto)cells cycles, data-driven model, epidemics, fractals and tumors, medical imagery, origin of life, pharmacokinetic, plasmids, …

Control theory, dynamical systems, chaos theory, fractals, large data, modeling, neural networks, numerical optimization, stochastic process, …

Some research axes & keywords

dynamix
Dynamical systems and complex systems

Application of dynamical systems

Themes
Exobiology, exoplanets, natural satellites, network waterways, orbital movements, reaction-diffusion, space debris, spatial geodesy, Turing instability

Chaos theory, control theory, dynamical systems, HPC, non linear functional analysis, optimization, perturbation theory, stochastic dynamics, symbolic computation, …

Some research axes & keywords

SOX
Social sciences, economics and complex systems

Complexity in Social systems, economy and finance

Themes
Economic growth, financial crises, information spreading, land use, opinion dynamics, price formation, public policies, residential mobility, social network, transport, Virtual Belgium, …

Complex networks, dynamical systems, HPC, large data, microsimulation, social simulator, …

Some research axes & keywords

xn
Complex networks

Complex networks

Themes
fMRI brain network, community detection, dynamics of and on complex networks, epidemics, human urban mobility, memory networks, social network, temporal networks, …

Data-driven model, dynamical systems, HPC, large data, stochastic process, …

Jobs @ naXys

We are looking for :

2 PhD students

1 post-doct

professor (tenure track)

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