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An Introduction into Courses Structure of the Unconventional Algorithms and Computation

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MBCS CIPT, www.bcs.org/
<http://www.springer.com/series/10624>

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Topics



- Lectures structure.
- Lecture content and timeline
- Consequences.



Objectives



The objectives of the lesson are:

- Discuss structure of lectures in important details and mutual relations.
- Lecture content and timeline
- Consequences.



General Introduction

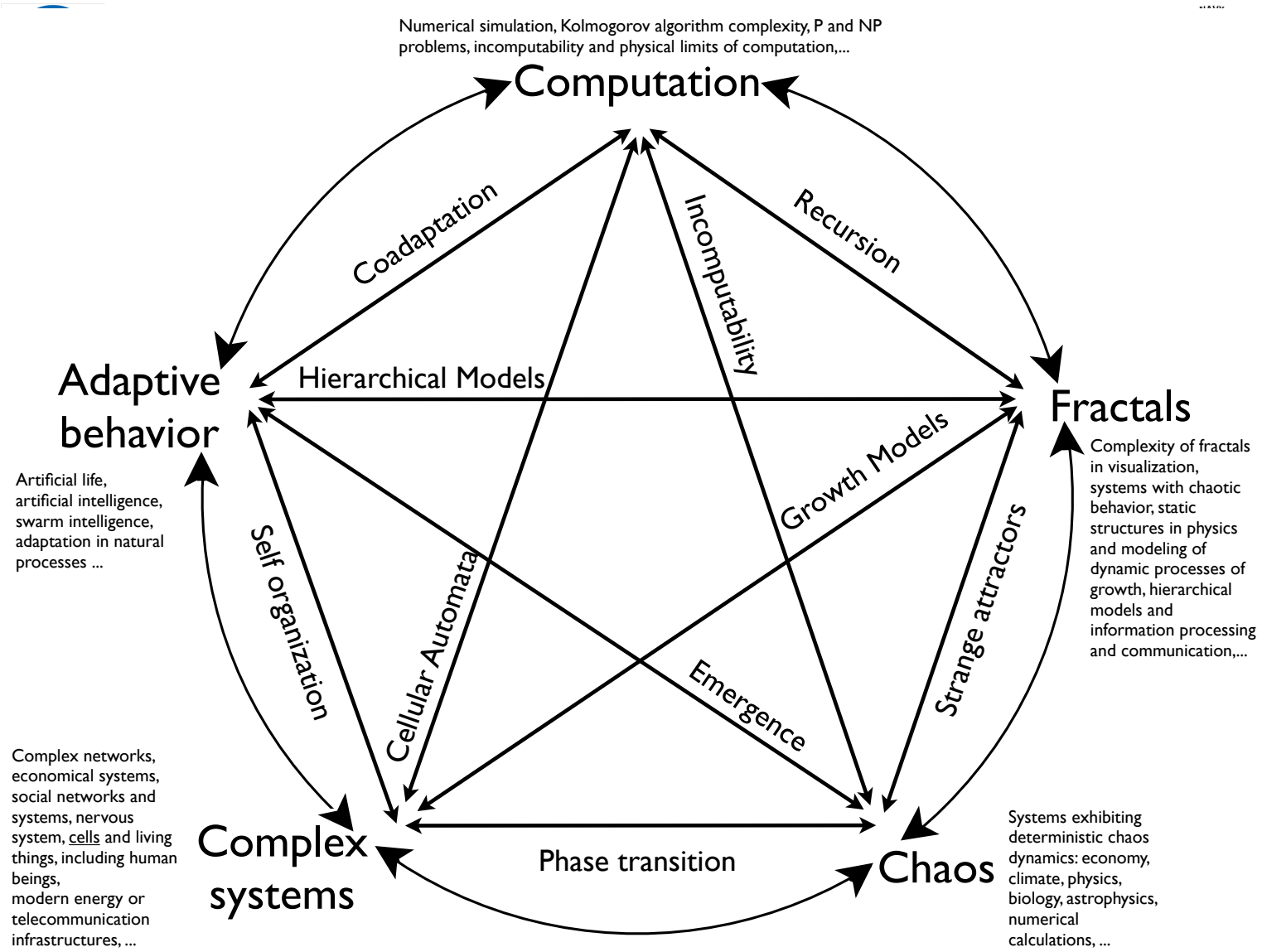


- **Modern and unconventional computing methods**
 - Artificial neural networks
 - Deterministic chaos
 - Fractal geometry
 - Cellular automata
 - Fuzzy logic
 - Unconventional computation such as
 - Optical computing
 - Quantum computing
 - Chemical computing
 - DNA computing
 - Reversible computing
 - Game sourcing and crowdsourcing



General Introduction

- **Relations and examples**
 - Artificial neural networks and swarm intelligence
 - Lem's predictions and Yuri Gorbys discoveries (non human "brain" system in the ocean)
 - ANN and swarm robotic
 - ANN and EAs
 - Deterministic chaos,
 - Principles and applications in encryption, data transmission, pseudorandom numbers generation by chaos, chaos computation, control and design of chaos by evolutionary algorithms, chaos in human systems, ...
 - Fractal geometry
 - Fractal antennas, games, picture compression, pattern design, encryption with ANNs, relations between chaos and fractals, ...
 - Cellular automata
 - Simulation of life, unconventional math problem solution (Wolfram's New kind of science), CA and music (Wolfram tones), ...
 - Fuzzy logic, relation with ANN and Eas, fuzzy rules identification by means EAs, ...
 - Unconventional computation and its relations with above mentioned methods





Credit conditions

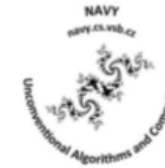
- Lectures are
 - not compulsory but **NECESSARY** for successful passing through labs exercises
 - evaluated at the end by exam with max 55 credits, 10 questions, each for 5 credit + 5 bonus 😊
- Laboratories are
 - compulsory and contain 10 protocols, all of them has to be finished properly
 - **Note:** please remember that laboratory examples and studies are designed for students that regularly visit NAVY lectures. Laboratory staff is for you there to help you with programming and examples collection, but not for teaching of materials, that is done on lectures!!!
 - supplied by protocols in word, see next slide



Laboratory protocols



Unconventional computation and algorithms Laboratory protocol



Topic: Artificial neural networks – unified framework

Lecturer: prof. Ing. Ivan Zelinka, Ph.D., Department of computer science, FEI VŠB-TU
Laboratory staff: Ing. Filip Zatloukal, Ing. Lukas Tomaszek, assoc. prof. Petr Saloun,
Department of computer science, FEI VŠB-TU

Name and student ID:

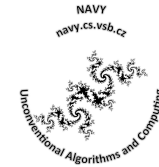
Date:

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Problem definition:

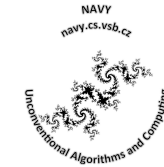
Create basic framework for artificial neural networks (ANN) that will contain in further lab examples different ANNs. Framework shall allow to user to read training sets for ANNs, set its parameters such as number of layers, epochs, neurons in layers etc... It is expected that ANNs will be then plugged in as a ready to use box (running also independently on command line) and its results will be graphically visualized and recorded into a suitable data file.

Solution design:



The Main Question

- Why those subject?
- Why its combinations?
- How deep and heavy are topics of NAVY lecture?
- What kind of benefit can I expect from knowledge I get by studying of NAVY course.
- Is knowledge from both courses applicable and usable in real life?
- What kind of knowledge and skills shall I have to successfully entry into this course?



**THANK YOU FOR YOUR ATTENTION
YOU ARE WELCOME IN BOTH COURSES**

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