Lecture series "Firing rate models in mathematical neurodynamics: universal mechanisms of pattern formation"

Teacher: Professor Dr. Igor Vertgeym (Institute of Continuous Media Mechanics, Ural Branch of RAS, Russia)

Location: Humboldt Universität zu Berlin
Mathematisch Naturwissenschaftliche Fakultät I
Institut für Physik
Statistical Physics and Nonlinear Dynamics & Stochastic Processes
Newtonstraße 15
12489 Berlin
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Date and time: April 23-25, 2014

Outline of Lecture Series:
1) Wed, April 23.
Lecture 1. Patterns in nature, their universality and description by amplitude equations. Derivation and characterization of main types of amplitude equations, methods of their solution and analysis, including those based on wavelet transform.

2) Thu., April 24.
Lecture 2: Modeling of single neuron behavior by amplitude equations. Burgers equation as a model of neural impulse propagation in an axon. Main properties of solutions and their relation to experimental data.

3) Fri., April 25.
Lecture 3: Wilson-Cowan equations and their generalizations in the neural field approach to neurodynamics. Derivation, connection with discrete neuron models, methods of solution, main properties of patterns.

Remarks: lecture course on nonlinear structures in physical and biological systems.

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