PHYS-805

Inference in Genetic Data

Ranganathan Ramakrishnan

Cursus	Sem.	Type
Physics		Obl.

Language of teaching	English
Credits	1
Session	
Exam	Oral
Workload	30h
Hours	**14**
Lecture	14
Number of positions	**30**

Frequency

Only this year

Remark

From:11/06/19 to 14/06/19

Summary

The term "complexity" is routinely used to describe biological systems. But what does it mean, precisely? This course comprises lectures that introduce the basic process of data analysis, modeling, and formulation of theory in biology with a set of case studies.

Content

The term “complexity” is routinely used to describe biological systems. But what does it mean, precisely? This course comprises lectures that introduce the basic process of data analysis, modeling, and formulation of theory in biology with a set of case studies in which deep understanding of biological systems has emerged through the application of this approach. An overall theme is to think about a rigorous definition of system complexity and to learn about strategies to rationally address such systems. As a counterpoint, we begin with the study of linear systems and the rich mathematical foundation for understanding and predicting their behaviors. We then move to non-linear systems and what makes them complex and difficult. We will explore several biological examples of biological non-linearity ranging from protein biochemistry to evolution, ending with a proposed general definition of complexity in biology and an operational strategy for studying such systems.

Note

Host: M. Wyart (EPFL SB IPHYS PCSL)
Swiss Universities

Learning Prerequisites

Recommended courses

stat mech 1 & 2 Biophysics

Expected student activities

The student must be able to understand physics-based inference methods for genetic sequence data.