Abstracts

German Tank Estimation and its application in the classification problem

Rasoul Hekmati

1:00pm

It is costly, time-consuming and hard to get new data for the scientific experiments. When it comes to the medical studies, It is even harder to find human subjects. So in most of the cases, we have to build our model (Classification for example) based on the restricted amount of the patients that we have. In this lecture, I explain German Tank Estimation and how it can help us to mitigate the data shortage problem. I explain how I used it in my own research on brain activity and how it helped me to build a more robust and trustful classifier to classify the epileptic patients with respect to their epileptic focus.

Impact of miRNA on cancer survival

Viktoria Muravina

1:15pm

MiRNAs are sets of 20-25 nucleotide-long non-coding RNAs that adjust gene expression. Each miRNA facilitates or impedes the expression of specific genes. There are several thousand of well identified miRNAs. Our goal is to identify miRNAs that have the most impact on cancer survival times.

Blood flow through arteries: Fluid-Structure Interaction approach

Prajakta Bedekar

1:30pm

I will talk about how to model blood flow through medium-to-large arteries using Navier-Stokes equations. Fluid flow causes wall movement and vice versa. We will see how this coupling is incorporated into the model. If time permits, we will see how some boundary conditions arise naturally out of the systems energy inequality. The talk will be preliminary. No previous knowledge of the subject will be assumed.

Partial occlusion efects on AlexNet

Kazem Safari

1:45pm

The main goal was to study the efects of partial occlusion nuisance on test accuracy of an AlexNet trained on MNIST, a dataset of handwritten digits. A moving patch was used as the partial occlusion nuisance. For each digit, the most sensitive patch location was found and qualitative results were presented.

Untitled

Tattwamasi Amrutam

2:00pm

Finding intermediate C^*-algebras between two given C^*-algebras has been an important problem for many years. In this talk, I will give conditions for which there exists no intermediate C^*-algebra between the reduced C^*-algebra and the reduced crossed product. I will also explicitly exhibit an example for the same.

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15 Minute Break

Quasi-static Dynamical Systems

Duong Nguyen

2:30pm

In this talk, I will introduce quasi-static dynamical systems (QDS), which is a generalization of the ordinary dynamical systems, and its connection to thermodynamics (although the scope of the QDS study is not limited to just thermodynamics). Some recent developments regarding ergodic theory and statistical properties of QDS will also be included.

A kinetic theory approach to pedestrian motion

Daewa Kim

2:45pm

In this talk, I would like to introduce the one mathematical model of pedestrian motion based on the statistical approach with the kinetic theory. The modeling approach considers dynamics caused by interactions of pedestrians not only with all the other pedestrians, but also with the geometry of the domain. There are four factors of interactions, which are the goal to reach the exit and the desire to avoid the collision with walls, and the tendency to look for less congested areas and to follow the stream unconsciously.

Well-posedness for weak solutions of axisymmetric div-curl systems

Juan Lopez

3:00pm

The div-curl system is a popular model in electromagnetics which asks to reconstruct a vector field with a prescribed divergence and curl. On bounded domains, the system may include normal or tangential boundary conditions. The domains topology may require extra conditions to be specified in order to guarantee the system has a unique solution. In this talk, I will describe well-posedness conditions for weak solutions of axisymmetric div-curl systems on bounded volumes of revolution with normal or tangential boundary conditions.

One-Bit Phase Retrieval

Dylan Domel-White

3:15pm

The phase retrieval problem tasks us with reconstructing signals based on intensity measurements. In the simple discrete case we model a "signal" by a vector x in a finite-dimensional Hilbert space H (real or complex), and model "intensity measurements" with the functions of the form $x \mapsto |f(x)|$ where f is a linear functional on H. After introducing the problem and discussing what is meant by "reconstruction", I will discuss a different measurement framework where even less information is retained from each measurement - just one bit.
