Student Seminar Series

Organized by AMS Graduate Student Chapter at SIUC

The AMS Student Chapter at SIUC is organizing the **Student Seminar Series** on **Fridays at 4:00 pm** for all graduate students. This series is to be run by the students, for the students; providing a platform for us to practice speaking in a friendly environment. The topics can be anything and everything including what we are currently researching or any topic that interests us immensely.

All the graduate students are invited to **participate either by giving a talk or by being present at this seminar**. If you are participating in an important seminar, you can take this opportunity as a practice session.

- *March 25, 2022*
  Speaker: Tharindu Priyan De Alwis, *SIUC*
  Title: Sufficient Dimension Reduction in Regression and Time Series
  Date: 03-25-2022
  Time: 5:00 - 6:00 pm
  Place: Neckers 156
  Abstract: In this talk, we will start with a brief introduction of sufficient dimension reduction (SDR), and the basic concepts of the SDR method in regression and time series problems. One of the most popular dimension reduction methods known as principal component analysis (PCA) with an example will be discussed, and the advantages and drawbacks of the PCA over the SDR method will be described. Some of the important SDR methods will be introduced and will be described with a numerical example. As an application, the process of estimating the SDR subspace is explained with the automobile dataset. In the last part of the talk, we will introduce the SDR method for time series problems and discuss further research directions in the SDR field.

- *March 18, 2022*
  Speaker: Wiranthe Herath, *SIUC*
  Title: Partial envelope models for multivariate time series
  Date: 03-18-2022
  Time: 4:00 - 5:00 pm
  Place: Neckers 156
  Abstract: We introduce partial envelope models for multivariate time series, which leads to a parsimonious technique when some lag variables are of particular relevance. In the estimate of the coefficients of some lag variables, our proposed model has the potential to generate huge efficiency gains compared to the standard vector autoregressive (VAR) model. The partial envelope models for multivariate time series focus on a subset of the important lag variables, and as a result efficiency in estimation can be improved. In this talk, we present a simulation study and a real data analysis to demonstrate efficiency gains from the partial envelope models in the time series context. (Joint work with Dr. S. Yaser Samadi)

- *March 4, 2022*

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Speaker: Mohammed Alshamrani, *SIUC*
Title: Smale Flows in S3
Date: 03-04-2022
Time: 4:00 - 5:00 pm
Place: Neckers 156
Abstract: We construct and visualize Lorenz Smale flows in 3-sphere using tools from knot theory and template theory**.**

- *February 18, 2022*
  Speaker: Gabriel Ngwe
  Title: Skorokhod Spaces and Stochastic Processes
  Date: 02-18-2022
  Time: 4:00 - 5:00 pm
  Place: Neckers 156
  Abstract: Let D denote the space of real-valued functions on [0,1] that are right-continuous and have left limits. Equipping D with the Skorokhod metric induces the Skorokhod topology used in the theory of stochastic processes. We present an overview of Skorokhod spaces and discuss their application to probability theory

- *February 4, 2022*
  Speaker: Roshini Samanthi Gallage
  Title: Analysis of Nonlinear Stochastic Differential Delay Equations
  Date: 02-04-2022
  Time: 4:00 - 5:00 pm
  Place: Neckers 156
  Abstract: We show the existence of a unique solution of certain nonlinear stochastic differential delay equations (SDDEs) with continuously distributed delay which satisfy the local Lipschitz condition but not the linear growth condition. In this study, we have established sufficient conditions on the coefficients to avoid the explosion and extinction in a finite time. Further, we show that Euler-Maruyama numerical approximations of such nonlinear SDDEs converge in probability to their exact solutions.
  (Joint work with Dr. Harry Randolph Hughes)

- *November 19, 2021*
  Speaker: Menake Wijerathne, *SIUC*
  Title: On supersingular representations of GL(2, D) over a p-adic field.
  Date: 11-19-2021
  Time: 4:00 - 5:00 pm
  Place: Neckers 410

Abstract: In this study we will obtain a standard basis for the pro-p-Iwahori invariant subspace of the supersingular representations of GL(2, D), where D is a finite dimensional central F-division algebra over Q**p.**

- ~~*November 12, 2021*~~
  Canceled due to school holiday.

- *November 5, 2021*
  Speaker: Porter Summers, *SIUC*
  Title: Reducibility of p-adic principal series representations of p-adic group
  Date: 11-05-2021
  Time: 4:00 - 5:00 pm
  Place: Neckers 410
  Abstract: We will define p-adic principal series representations and discuss the question of reducibility. In the process we explore the structure of reductive groups, Iwasawa modules, and the role of Schneider-Teitelbaum duality in studying p-adic Banach space representations.

- *October 29, 2021*
  Speaker: Dr. Layla Sorkatti, *University of Khartoum and Al-Neelain University*
  Title: Quaternion algebras
  Date: 10-29-2021
  Time: 4:00 - 5:00 pm
  Place: Neckers 410
  Abstract: We prove that there are exactly 3 normed R-algebras. These are R, C and H. We then see, as an application that, every natural number can be written as a sum of 4 integer squares. We end up by generalising the Hamilton's quaternions to some other type of quaternion algebras.

- *October 22,2021*
  Speaker: Gihanee Senadheera, *SIUC*
  Title: Effective Concept Classes of PACi/PAC, Incomparable Degrees and Jump Structure
  Date: 10-22-2021
  Time: 4:00 - 5:00 pm
  Place: Neckers 410
  Abstract: The Probably Approximately Correct (PAC) learning is a machine learning model introduced by Leslie Valiant in 1984. The PACi reducibility refers to the PAC reducibility independent of size and computation time. This reducibility in PAC learning resembles the reducibility in Turing computability. In 1957 Friedberg and Muchnik independently solved the Post problem by constructing computably enumerable sets A and B of incomparable degrees using the priority construction method. We adapt this

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idea to PACi/PAC reducibilities and construct two the effective concept classes C0 and C1 such that C0 is not reducible to C1 and vice versa. When considering PAC reducibility it was necessary to work on the size of an effective concept class, thus we use Kolmogorov complexity to obtain the size. Analogous to Turing jump, we give a jump structure on effective concept classes. As the future work, we begin to explore an embedding of structures from PAC degrees to 1-1 degrees or Turing degrees.