BGSU Department of Mathematics and Statistics

BOWLING GREEN STATE UNIVERSITY

Weekly Calendar – Spring Semester 2025
Week 11, March 24-28

Monday, March 24	
Tuesday, March 25	**TTF Candidate Teaching Presentation** 9:00am – 9:30am, McLeod Hall 459 Topic: Candidate's choice from statistics or data science concepts **TTF Candidate Open Meeting with Faculty/Graduate Students** 9:45am – 10:45am, McLeod Hall 459 **Graduate Student Seminar** 11:00am – 12:00pm, McLeod Hall 459 Speaker: Kadir Yucel Title: Kähler Identities **TTF Candidate Open Meeting with Faculty/Graduate Students** 2:15pm – 2:45pm, McLeod Hall 459 **TTF Candidate Research Presentation** 3:00pm – 4:00pm, McLeod Hall 459 Topic: Mixed-Poisson Autoregression for Multivariate Overdispersed Data
Wednesday, March 26	**Geometry and Topology Seminar** 12:00pm – 1:00pm, via Zoom link TBA Speaker: Tomoya Tatsuno, University of Oklahoma Title: Sectional Curvature Pinching of Two-Step Nilmanifolds **Analysis Reading Seminar** 2:30pm – 3:20pm, McLeod Hall 459 Speaker: Abraham Orinda Title: Hypercyclicity of the half-angle operator, Part 2 **Advisory Committee** 3:30pm – 4:30pm, McLeod Hall 400
Thursday, March 27	
Friday, March 28	**Faculty Meeting with Data Science/Statistics Search Committee** 3:30pm – 5:00pm, McLeod Hall 459 **Peer Mentor Seminar** 3:30pm – 5:00pm, McLeod Hall 240

ABSTRACTS

TTF Candidate Research Presentation

Title: Mixed-Poisson Autoregression for Multivariate Overdispersed Data

Abstract: This presentation introduces a new parametric autoregressive model for multivariate overdispersed count time series data. Within the framework of the INteger-valued Generalized AutoRegressive Conditional Heteroskedastic (INGARCH) structure, count-valued vector responses are assumed to follow a family of multivariate mixed Poisson (MMP) distributions conditional on past values. Consequently, the proposed model accommodates varying degrees of overdispersion and contemporaneous correlation, as well as flexible autocorrelations. For parameter estimation, maximum likelihood (ML) estimation is employed. To mitigate the computational burden and numerical instability encountered when directly optimizing the likelihood function, the expectation-maximization (EM) algorithm is derived by leveraging the conditional specification of the MMP distributions. Additionally, Monte Carlo integration and the generalized EM principle are applied to handle the lack of closed-form solutions in the E-step and M-step, respectively. The performance of the ML estimator based on the EM algorithm is evaluated through simulation studies. Finally, an illustrative example is provided to demonstrate the practical applicability of the proposed model to real-world problems.

Geometry and Topology Seminar

Title: Sectional Curvature Pinching of Two-Step Nilmanifolds

Abstract: Nilmanifolds are homogeneous Riemannian manifolds admitting a transitive nilpotent Lie group of isometries. By classical results (Wolf, Milnor), nilmanifolds are always of mixed curvature. Two-step nilmanifolds are particularly important, as they play a crucial role in the classification of quarter-pinched homogeneous manifolds of negative curvature by Eberlein and Heber. Given a two-step nilmanifold, we study its pinching constant, which is the ratio of the minimum and maximum of sectional curvature.

A prototype of a two-step nilmanifold is the 3-dimensional Heisenberg group (so-called Nil). In this case, it is well known that the pinching constant is -3. In this talk, we show that for any two-step nilmanifold, the pinching constant lies in the compact interval [-3, -3/2]. We give examples of two-step nilmanifolds that achieve the bounds -3 and -3/2, respectively. Moreover, we discuss why the bounds -3 and -3/2 are special in terms of rigidity.