



Online ISU Algebra Seminar

Date and Time: September 23, 2021, from 1:00 pm to 1:50 pm

Speaker: George F. Seelinger, Ph. D. (Illinois State University)

Title: An Update on the Search for Mathieu Subspaces in Matrix Algebras

Abstract: In 2010, Wenhua Zhao introduced the concept of a Mathieu subspace of an associative algebra as a generalization of an ideal of such an algebra. The Mathieu subspace structure of an associative algebra is much richer than the ideal structure of these algebras, but these structures are not as well known. In 2012, Zhao characterized Mathieu subspaces of finite-dimensional algebras in terms of idempotents but getting a complete classification of such Mathieu subspaces has proven elusive in a large majority of cases.

In this talk, I will provide an update on the joint work with Wenhua Zhao on the study of Mathieu subspaces of matrix algebras over fields. As such algebras are simple rings (hence not containing any proper two-sided ideals), by Zhao's 2012 Idempotent Theorem the proper Mathieu subspaces are those subspaces not containing any idempotents. Here I will give a complete classification of Mathieu subspaces of $M_2(F)$ as well as give some examples of Mathieu subspaces in $M_3(F)$, when F is a field whose characteristic is not 2 or 3.

About Speaker:

George Seelinger got his Ph.D. from The University of Texas at Austin in 1991 where he did a dissertation in the area of Geometric Invariant Theory. Geometric Invariant Theory involves actions of algebraic groups on algebraic varieties and looking at the geometric structure of the quotient of this action.

From 1991 to 2002 he held a faculty position at Northern Illinois University. In 2002, he became Chair of the Mathematics Department at Illinois State University. His research interests include algebraic transformation groups, vector space partitions, and Mathieu subspaces of matrix rings.

Zoom meeting information

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