

S E M I N A R



Stuart M. Gomani
University of KwaZulu-Natal

Date:

Tuesday, 19 November 2024

Time:

12h15-13h15 SAST

Venue:

- **NITheCS Seminar Room**
University of KwaZulu-Natal
Westville Campus
3rd Floor, H-Block,
School of Chemistry and Physics
- **Online**

Refreshments will be served

WHO SHOULD ATTEND?

This talk is intended to be accessible to postgraduate students. All are welcome!

ENQUIRIES:

Email Neli Mncube:
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Designs, Codes and Graphs Invariant under the Mathieu Groups M_{11} & M_{12}

ABSTRACT:

We present results concerning with calculations carried out to construct all point-transitive and block-primitive $1-(v, k, \lambda)$ -designs that are obtained from the maximal subgroups and the conjugacy classes of elements of the Mathieu groups M_{11} and M_{12} from the class of sporadic groups. For each design constructed in this way, we determined the structure of the corresponding automorphism group. We also construct codes defined by the binary row span of the incidence matrices of the designs invariant under M_{11} . Furthermore, we obtain some few-weight codes with interesting properties and construct strongly regular graphs with known parameters defined by the non-zero codewords of some of the codes constructed from the incidence matrices of designs under M_{12} . Moreover, we determine regular graphs defined by the designs and thus provide an interplay between designs, regular graphs, strongly regular graphs and binary codes on which the small Mathieu groups act as permutation groups of automorphisms.

Stuart Gomani is a mathematics lecturer at the Malawi University of Business and Applied Sciences. He is completing a PhD at the University of KwaZulu-Natal.

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