

SEMINAR

Monomials, graphs and determinants

ABSTRACT

Finite-dimensional commutative associative semisimple (CASS) algebras arise naturally in problems at the intersection of AdS/CFT, representation theory and quantum information. Such algebras possess projector bases, which, in important examples involving group algebras, are used in the construction of gauge-invariant operators. The centres of group algebras also possess bases labelled by conjugacy classes, and small subsets of these basis elements can form non-linear generating sets.

We propose a new linear basis for a CASS algebra, constructed from monomials in an ordered set of the generators. We describe how the relevant algebra data is encoded in a layered degeneracy graph, whose combinatorial structure determines the proposed monomials. We discuss how the number of these monomials matches the dimension of the algebra. Lastly, we discuss the matrix relating the proposed monomials to the projector basis and conjecture a general non-vanishing formula for its determinant.

Dr Garry Kemp is a Senior Lecturer at the University of Johannesburg and holds a PhD from the University of the Witwatersrand (Wits). His recent work explores the mathematical structures underlying gauge theories, holography, and quantum information, bringing together ideas from physics and pure mathematics.



Dr Garry Kemp
(University of Johannesburg)

DATE:
Tuesday, 1 September 2026

TIME:
13h15-14h15 SAST

- VENUES:**
- Honours Presentation Room P213
2nd floor, School of Physics
East Campus
University of the Witwatersrand
 - Online

WHO SHOULD ATTEND?
All are welcome.

ENQUIRIES:
Email Antonette Gouws:
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