

GRADUATE SEMINAR

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The search for small association schemes with noncyclotomic eigenvalues

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2:30 p.m.

Location: <https://uregina-ca.zoom.us/j/94125367372>

Abstract:

The theme of this talk is the investigation of an old question in algebraic combinatorics, which is the Cyclotomic Eigenvalue Question (CEQ). The question asks whether all entries of the character table of a commutative association scheme lie in a cyclotomic extension of the rational number field. An interesting direction to study the CEQ is to consider the problem for more general objects, which are table algebras.

We will consider standard integral table algebras with integral multiplicities (SITAwIMs). Our approach is to first generate the smallest SITAwIMs of the given rank. Then, using feasibility and realizability criteria for association schemes, we analyze the CEQ for SITAwIMs. Using this approach we were able to show all association schemes of rank 4 (or less) and all asymmetric association schemes of rank 5 have cyclotomic eigenvalues. For symmetric rank 5 SITAwIMs, we have found sixteen examples of feasible parameter sets up to order 1000 with noncyclotomic character values.

In this presentation we will discuss our methods and review available feasibility criteria for this family of table algebras with noncyclotomic character values.

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