GRADUATE SEMINAR

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On standard integral table algebras with integral multiplicities and noncyclotomic character values

PhD Candidate supervised by
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2:30 p.m.
Location: on zoom

Abstract: An integral table algebra $(A, \mathbf{B})$ is a finite-dimensional complex algebra A with involution $*$ whose distinguished basis $\mathbf{B}$ is $*-$invariant, contains 1, produces non-negative integer structure constants, and satisfies the pseudo-inverse condition: for all $b, c \in \mathbf{B}$, the coefficient of 1 in bc is positive if and only if $c = b^*$. The basis $\mathbf{B}$ is called standard when, for all $b \in \mathbf{B}$, the coefficient of 1 in bb^* is equal to the maximal eigenvalue of b. A typical example of table algebras are adjacency algebras of association schemes, for which the defining basis is standard.

In 1980, Simon P. Norton posed the Cyclotomic Eigenvalue Question (CEQ) at an Oberwolfach Conference. The CEQ asks if the entries of the character table of a commutative association scheme always lie in cyclotomic number fields.
Herman and Rahmani Barghi (2011) proved that the CEQ holds for Schurian association schemes and commutative quasi-thin schemes. In this presentation, we prove that up to rank 4, standard integral table algebras with integral multiplicities (SITAwIM's) have cyclotomic character tables. We also present an example of rank 5 SITAwIM of order 249 with noncyclotomic character table.

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