TERWILLIGER ALGEBRAS BEYOND DISTANCE-REGULAR GRAPHS: A COMBINATORIAL APPROACH

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The Terwilliger algebra T has been extensively studied in the context of distance-regular graphs, which have only a few irreducible T-modules (up to isomorphism) of a specific endpoint, all of which are thin (with respect to a certain base vertex).

This talk aims to extend these results to irreducible T-modules with endpoint 0 of certain (not necessarily distance-regular) graphs, and shed some new light on their combinatorial properties.

Let Γ be a finite, simple, and connected graph. We examine which vertices x of Γ admit a Terwilliger algebra $T = T(x)$ with an irreducible T-module with endpoint 0, which is thin. We give a purely combinatorial characterization to this algebraic property, which involves the number of certain walks in Γ of a specific shape.