

Symmetries of spatial graphs and Simon invariants

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An ordered and oriented 2-component link L in the 3-sphere is said to be *achiral* if L is ambient isotopic to its mirror image $L!$ ignoring the orientation and ordering of the components. Kirk-Livingston showed that if L is achiral then the linking number of L is not congruent to 2 modulo 4.

On the other hand, let K_5 and $K_{3,3}$ be a complete graph on five vertices and a complete bipartite graph on $3 + 3$ vertices respectively. For spatial embeddings of K_5 and $K_{3,3}$, the *Simon invariant* is defined, that is an odd integer valued invariant calculated from their regular diagrams, like the linking number. Simon invariants and linking numbers play a fundamental role in the homology classification of spatial graphs.

In this talk, with Kirk-Livingston's result above as an opportunity, we consider orientation preserving symmetries and orientation reversing symmetries of 2-component links, spatial embeddings of K_5 and spatial embeddings of $K_{3,3}$ induced by permutations on vertices, and completely determine the relationship between linking numbers, Simon invariants and their symmetries.

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