Rigid Linkage Forcing

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Given a simple graph, a linkage is a subgraph in which each connected component is a path. The pattern of a linkage is a set with elements the sets of endpoints of each component path. A linkage is called unique if it is the only linkage possible with its pattern, and spanning if it contains all the vertices of the graph. Robertson and Seymour defined a vital linkage as a spanning linkage which is unique. A rigid linkage is a special type of vital linkage defined by a rigid linkage forcing process. Rigid linkage forcing, as a variation of standard zero forcing, is a coloring game on a simple graph played according to a certain color change rule. The coloring process defines a rigid linkage for the graph. Zero forcing was introduced in the linear algebra community as an upper bound to the maximum multiplicity of an eigenvalue of a symmetric matrix whose off-diagonal pattern of zeros is determined by a graph. Rigid linkage forcing is a variation of zero forcing created to obtain bounds on the multiplicities of eigenvalues in this family of matrices. It this talk I will share the rules for rigid linkage forcing, and show how rigid linkages are connected to multiplicities of eigenvalues of symmetric matrices determined by the graph.

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