Jackson, Bill; Jordán, Tibor

On the rigidity of molecular graphs. (English) Zbl 1199.52036


A graph is called rigid if a generic bar-and-joint framework corresponding to it is rigid in the usual (kinematic) sense. The authors study the rigidity of squares of graphs, which are also called molecular graphs because they are used to study the flexibility of molecules. The Molecular Conjecture, posed in 1984 by T. S. Tai and W. Whiteley [Topologie Struct. 9, 31–38 (1984; Zbl 0541.51021)], states that the square $G^2$ of a graph $G$ of minimum degree at least two is rigid if and only if $5G$ contains six edge-disjoint spanning trees.

The main result of the paper under review is a lower bound on the degrees of freedom of $G^2$ in terms of forest covers of $G$. This implies that the existence of the above six spanning trees is a necessary condition for the rigidity of $G^2$.

Reviewer: Johann Linhart (Salzburg)

MSC:

52C25 Rigidity and flexibility of structures (aspects of discrete geometry)
05C90 Applications of graph theory
52B40 Matroids in convex geometry (realizations in the context of convex polytopes, convexity in combinatorial structures, etc.)

Keywords:

rigidity of graphs; molecular conjecture

Full Text: DOI Link

References:


This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.