

Rigidity of v_k -configurations

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A framework of a graph is rigid if no motion of the graph, preserving edge lengths, changes the distance between two vertices. Equivalently, a graph is rigid if it can only move by translation and rotation. A graph that is not rigid is flexible. Under certain conditions on the coordinates of the vertices, we can determine whether or not a planar framework of a graph is rigid by looking at the underlying graph [1].

A geometric v_k -configuration is a collection of v straight lines and v points in the plane such that there are k points on each line and k lines through each point. A geometric v_2 -configuration is a framework of a graph, so geometric v_k -configurations generalise frameworks of graphs.

In this talk we will consider the rigidity properties of v_k -configurations. A geometric v_k -configuration is rigid if the only motions of it, preserving point-line incidences and distances between collinear points, are translation and rotation. A geometric v_k -configuration that is not rigid is flexible.

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References

- [1] G. Laman, On graphs and rigidity of plane skeletal structures. *J. Engrg. Math.* **4** (1970) 331– 340.