

Abstract

**The smallest non-rank 3 graphs
with the 4-vertex condition**

Sven Reichard

Greifswald, Germany

The t -vertex condition was introduced by Hestenes and Higman as a combinatorial property shared by all rank 3 graphs, but not by all strongly regular graphs. Examples of graphs with the 4-vertex condition include the point graphs of generalized quadrangles.

Using a database of small strongly regular graphs compiled by Ted Spence, we determined the smallest graphs which satisfy the 4-vertex condition but do not have a rank 3 automorphism group. There are three of them, and they share the parameters of the rank 3 representation of $U_3(3)$ on 36 points. We will give computer-free descriptions of these graphs and discuss possible generalizations.

This is a joint project with M.Klin, M.Meszka, A.Rosa, which is also based on a collaboration with M.Muzychuk and E.Spence.