

## Large Totally symmetric edge-colored graphs

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We say that an edge-colored graph is totally symmetric (tsc-graph) if its group of automorphisms is nontrivial, edge transitive, and moreover the group of symmetries of colors is the full symmetric group. In case of graphs (two colors), these are known as self-complementary symmetric graphs and they were fully described by W. Peisert. We have proven that:

- there is an infinite family of tsc-graphs for three colors,
- there are tsc-graphs for four and five colors,
- there is no tsc-graph with more than five colors,
- there is only a finite number of tsc-graphs with more than three colors.

The proof relies on the classification of finite simple groups.