

Title: Group connectivity of graphs

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Abstract: The main topic of this thesis is the group connectivity of graphs, especially  $\mathbb{Z}_2^2$ - and  $\mathbb{Z}_4$ -connectivity. We implement a program in C++, which tests the group connectivity and we use it to find graphs which are group connected in one of these groups and aren't connected in the other. We consider graphs created by subdividing edges of specific graphs, like  $K_4$  or cube. The main result of this work is finding two graphs which are  $\mathbb{Z}_4$ -connected and aren't  $\mathbb{Z}_2^2$ -connected. We also wrote a program in Prolog using CSP to check that these two graphs are  $\mathbb{Z}_4$ -connected. We proved analytically that one of these graphs isn't  $\mathbb{Z}_2^2$ -connected.

Keywords: group connectivity, flows, group