

The bondage number of graphs on topological surfaces and Teschner's conjecture

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The domination number of a graph is the smallest number of its vertices adjacent to all the other vertices. The bondage number of a graph is the smallest number of its edges whose removal results in a graph having a larger domination number. In a sense, the bondage number measures integrity and reliability of the smallest dominating sets with respect to edge removals, which may correspond, e.g., to link failures in communication networks. The decision problem for the bondage number is known to be NP-hard.

We provide constant upper bounds for the bondage number of graphs on topological surfaces, and improve upper bounds for the bondage number in terms of the maximum vertex degree and the orientable and non-orientable graph genera. Also, we present stronger upper bounds for graphs with the number of vertices larger than a certain threshold in terms of graph genera. This settles Teschner's Conjecture in affirmative for almost all graphs. This is joint work with Vadim Zverovich, University of the West of England, Bristol, UK.