Colouring problems related to graph products and coverings Ágnes Tóth

In the thesis we concentrate on two topics of graph colouring problems.

On the one hand, we investigate the asymptotic behaviour of colouring-related graph parameters for different graph powers. For instance, we answer a question of Alon and Lubetzky about the asymptotic value of the independence ratio for the so-called categorical graph power. From the result we obtain a proof for the conjecture of Brown, Nowakowski and Rall, stating that asymptotic value of the independence ratio for disjoint union of two graphs is the maximum of the value of the parameter for the two graphs.

On the other hand, we discuss problems on coverings with monochromatic components in edge-coloured graphs. One of our results states that if the edges of a graph are colored so that no multicoloured triangles appear then the whole vertex set can be covered with a constant number of connected monochromatic subgraphs where the constant depends only on the independence number of the graph.