



*Invited lecture*

## HEREDITARY PROPERTIES OF GRAPHS

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We shall provide a survey of results concerning hereditary properties of graphs. The presented results were obtained mainly in co-operation with P. Mihók, R. Vasky, M. Frick, M. Borowiecki, I. Broere, A. Farrugia, R.B. Richter.

The original graph colouring problem can be reformulated in the following way: Determine the minimum number of independent sets to which the vertex set of  $G$  can be partitioned. A natural generalization of this problem can be obtained in such a way that we replace the adjacency constraint by some constraint on the structure of monochromatic subgraphs. A convenient language that may be used for formulating problems of graph colouring in a general setting is the language of reducible monotone properties.

In our contribution we shall discuss:

- the lattice of hereditary properties and its utilisation for the comprehensive study of generalised colouring;
- a characterisation of hereditary properties of graphs in terms of forbidden subgraphs, maximal graphs and generators;
- extremal problems related to hereditary properties of graphs;
- graph invariants and their relationship to the chains of hereditary properties;
- minimal reducible bounds and their utilisation for an evaluation and comparison of different colouring and partitioning results;
- the problem of unique factorization of hereditary properties of graphs and its various modifications;
- complexity results concerning hereditary properties of graphs;
- an application of formal concept analysis to the field of hereditary properties of graphs.