

EIDMA MINICOURSE ON STRUCTURAL GRAPH THEORY

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LECTURE 9: Perfect graphs

Topics: Examples of perfect graphs, communication complexity, graph entropy and applications, the perfect graph theorem of Lovasz, polyhedral aspects, relation to geometric optimization, graph entropy and application to sorting, the imperfection ratio and application to the channel assignment problem, stable matchings and the theorem of Gale and Shapley, 2-joins, skew partitions and the Strong Perfect Graph Theorem.

Recommended reading: [RR] and my lecture notes (see the minicourse page for a link)

Exercises

1. Prove that the following classes of graphs are perfect: bipartite, line graphs of bipartite, chordal, comparability graphs.
2. Prove that the complements of the classes listed above are perfect.
3. Prove that no minimally imperfect graph has an even pair (a pair of distinct vertices u, v such that every induced u - v path is even).
4. Prove that no minimally imperfect graph has a 2-join (see [RR] for a definition).