

New Proofs for Strongly Chordal Graphs and Chordal Bipartite Graphs

Michael J. Pelsmajer
Illinois Institute of Technology
Jacent Tokaz
National Security Agency
Douglas B. West *
University of Illinois

Abstract

We give new proofs of well-known characterizations of strongly chordal graphs and chordal bipartite graphs. In particular, we give a relatively short proof of Farber's forbidden subgraph characterization of strongly chordal graphs. To do this, we prove that the induced subgraphs of a graph all have simple vertices if and only if the graph is a sun-free chordal graph, by showing that each property holds if and only if the maximal cliques of the graph form a totally balanced hypergraph. The key ingredient is the dual hypertree structure for totally balanced hypergraphs. We also consider split graphs and threshold graphs.