PERFECT DIGRAPHS

STEPHAN DOMINIQUE ANDRES \(^1\) AND WINFRIED HOCHSTÄTTLER

Faculty of Mathematics and Computer Science
FernUniversität in Hagen

e-mail: dominique.andres@fernuni-hagen.de, winfried.hochstaettler@FernUni-Hagen.de

The clique number \(\omega(D)\) of a digraph \(D\) is the size of the largest bidirectionally complete subdigraph of \(D\). \(D\) is perfect if, for any induced subdigraph \(H\) of \(D\), the dichromatic number \(\chi(H)\) defined by Neumann-Lara [4] equals the clique number \(\omega(H)\). Using the Strong Perfect Graph Theorem [3] we give a characterization of perfect digraphs by a set of forbidden induced subdigraphs. Modifying a recent proof of Bang-Jensen et al. [1] we show that the recognition of perfect digraphs is co-\(\mathcal{NP}\)-complete. It turns out that perfect digraphs are exactly the complements of clique-acyclic superorientations of perfect graphs. Thus, we obtain as a corollary that complements of perfect digraphs have a kernel, using a result of Boros and Gurvich [2]. Finally, we prove that it is \(\mathcal{NP}\)-complete to decide whether a perfect digraph has a kernel.

**Keywords:** dichromatic number, perfect graph, perfect digraph, Berge graph, clique number, clique-acyclic superorientation.

**AMS Subject Classification:** 05C17, 05C20, 05C15.

References


\(^1\)Partial support by the Fakultätspreis of the Faculty of Mathematics and Computer Science of the FernUniversität in Hagen is gratefully acknowledged