



INVERSES OF BICYCLIC GRAPHS*

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Abstract. A graph G is said to be nonsingular (resp., singular) if its adjacency matrix $A(G)$ is nonsingular (resp., singular). The inverse of a nonsingular graph G is the unique weighted graph whose adjacency matrix is similar to the inverse of the adjacency matrix $A(G)$ via a diagonal matrix of ± 1 s. Consider connected bipartite graphs with unique perfect matchings such that the graph obtained by contracting all matching edges is also bipartite. In [C.D. Godsil. Inverses of trees. *Combinatorica*, 5(1):33–39, 1985.], Godsil proved that such graphs are invertible. He posed the question of characterizing the bipartite graphs with unique perfect matchings possessing inverses. In this article, Godsil's question for the class of bicyclic graphs is answered.

Key words. Adjacency matrix, Bicyclic graph, Perfect Matching, Alternating path, Inverse graph.

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