

Pancyclicity of Almost-Planar Graphs

Santiago T. Adams, California Institute of Technology

Sandra R. Kingan*, Brooklyn College and the Graduate Center, CUNY

A non-planar graph is almost-planar if, for every edge e , either deleting or contracting e results in a planar graph. A graph with n vertices is pancyclic if it contains a cycle of every length from 3 to n and it is Hamiltonian if it contains a cycle of length n . A Hamiltonian-path is a path of length n and a graph with a Hamiltonian path between every pair of vertices is called Hamiltonian-connected. We prove that a k -connected almost-planar graph is pancyclic if and only if it has a cycle of length 3. Furthermore, we prove that a 4-connected almost-planar graph is both pancyclic and Hamiltonian-connected. The proofs use Gubser's 1990 characterization of the extremal 3-connected almost-planar graphs.

Keywords: graph minors, extremal graphs, Hamiltonian cycles, pancyclic graphs